POPULAR SCIENCE

MONTHLY

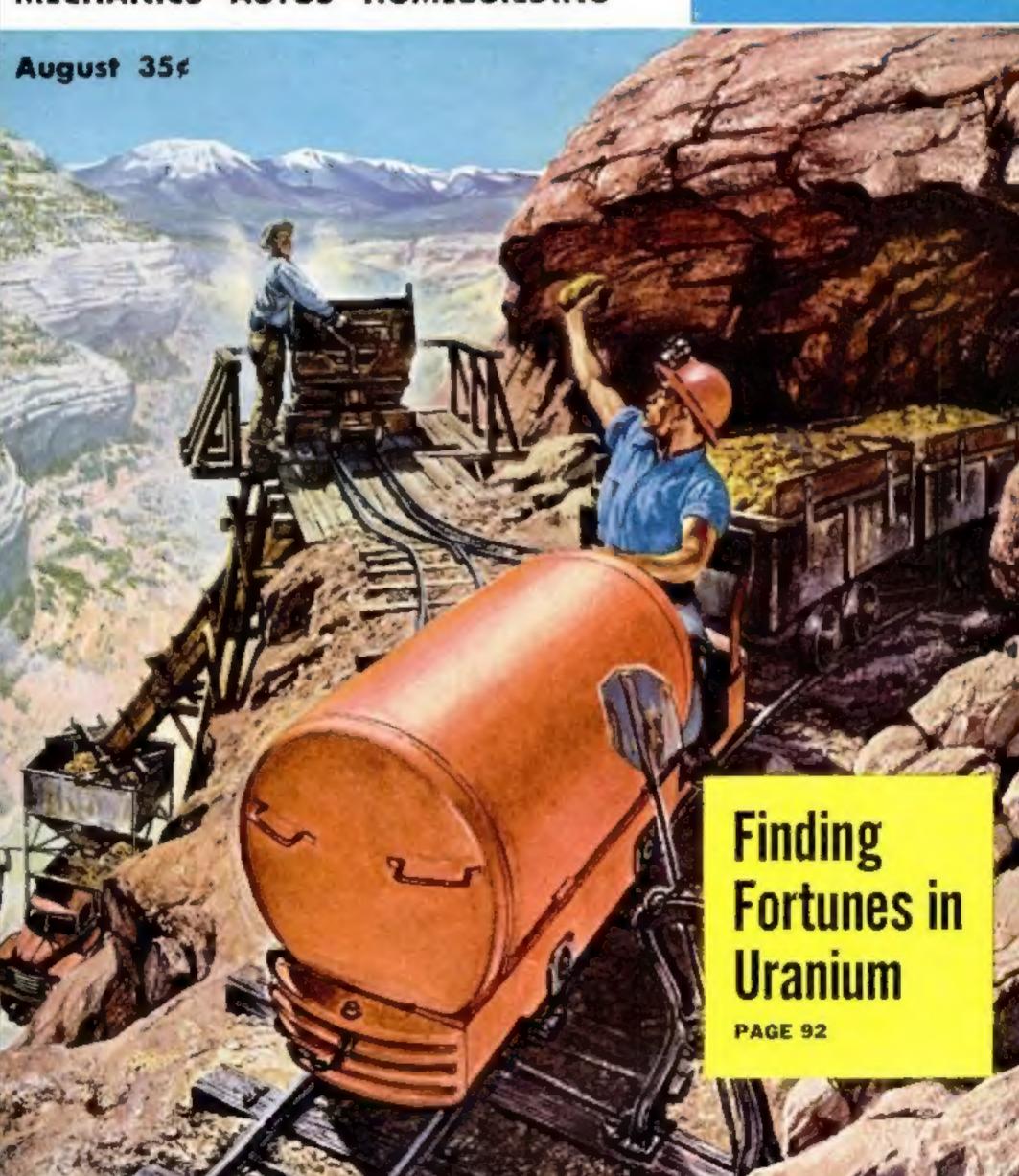
MECHANICS - AUTOS - HOMEBUILDING

America's Newest Superhighway

Previewed on PAGE 65

Biggest Ship Ever Built

Exclusive Pictures on PAGE 128



BLACK FOREST

KORIUM

Hunting Knife

Solingen Steel

The famed BLACK FOREST HUNTING KNIFE made in Solingen. West Germany of superfine Nicht Rostend (non-rusting) steel is NOW avoilable in this country! The rugged beauty of this superb knife has already wan recognition for design in industrial sircles on the Centinent-ond its utility and value as on aid In hunting & fishing has made it a prime favorite with sportsmen all over Europel Blade is actually sharp enough to shave with; it will sland up against the most rugged treatment; the genuine leather scabbard is metal tipped. Length, 10 inches, Tough, sturdy Salingen steel assures you years of dependable service. The sleek, graceful lines of this new German import pluo provide an ideal recreation room or den decoration—a dandy gift for men—and a hunter's delight! It's a real collector's item, too; graces any wall or fireplace, Import supply is limited and the low 3.95 price (postpaid! for \$0/H knife and scabbord means you'll have to act fast! Send 3.95 for prempt dalivery. CODs plus less. Your money back quickly if you're not delighted! Use convenient toupon below.



MAKE THIS TEST!

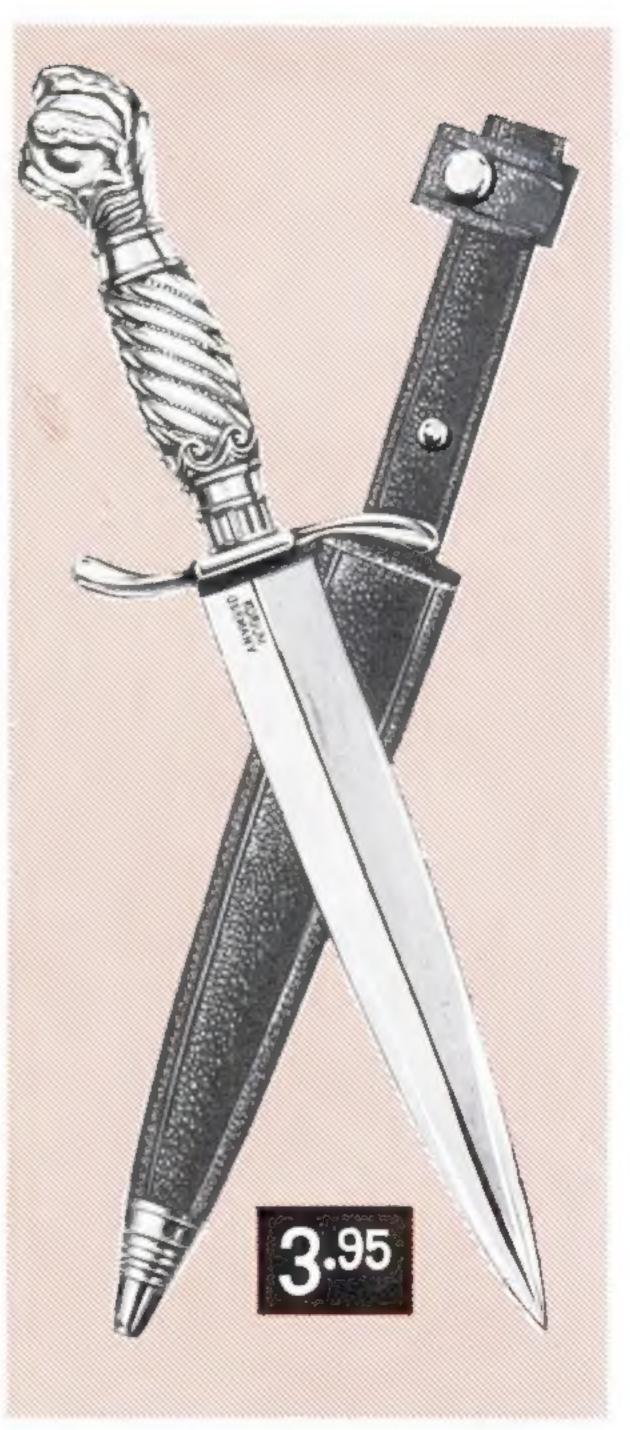
The Black Forest Hunting Knife is SUPER SHARP! Just try this simple test and PROVE IT? Lather a section of your chie or check and run the keen edge of the blade over it lightly. Then FEEL your skin! . . . just like shaving with your favorite razer!

Thoresen's Dept. 7-H-EO 352 Fourth Ave., New York 10, N.Y.

Please RUSH Black Forest Heating Knife and genuine leather scabbard on 5 Day Trial. If I am not delighted with this remarkable hunting & fishing aid. I will return it in 5 days for FULL REFUND. 3.93 enclosed. Send propoid. Send C.O.D. plus charges.

NAME	
ADDRESS	

CITY ZONE STATE
(Canadians: Send orders direct to THORESEN CO., Dept. 7-H-80
45 St. James St., West Montreal 1, P.Q.)





You'll call it "miracle flooring," too, when you see for yourself how rugged, durable MATICO Aristoflex shrugs off household acid, alkali and grease...stays new and sparkling looking with easy damp moppings. Biggest miracle of all is the pricel Produced especially to meet the needs of homeowners everywhere, MATICO

Aristoflex is low in cost...gives you more for your money. And you can install economical Aristoflex in every room in your home...from basement to attic. See Aristoflex in 12 rich, clear colors at your MATICO dealer soon. You'll find him listed in your classified telephone directory.

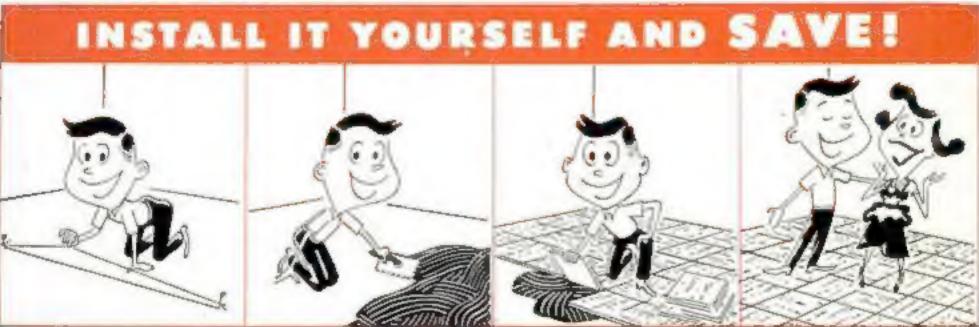


MASTIC TILE CORPORATION OF AMERICA

Jollet, III. . Long Beach, Calif. . Newburgh, N. Y.

Manufacturers of:

Aristoflex . Confetti . Parquetry . Asphalt Tile . Cock Tile . Plastic Wall Tita



st's easyt Just mark a straight line through the center of your room in both directions, using a chalk and tine. Be careful not to cover up your guide lines. With a notched trowel, spread adhesive over onehalf of your room at a time. leave only a thin coat of adhesive on the floor.

After adhesive becomes tacky, snap the tiles into place. Do not slide tiles or adhesive will push up between the tiles.

Here's the best part! Show your wife your handiwork. (Don't tell her what a cinch it is with MATICO's easy-to-follow instructions).

Founded 1,873, Vol. 165; No. 2



Mechanics and Handleraft 160. U.S. Fat, Oct.

August, 1954 Pa	ge
New Road Hops Daniel Boone's Mountains	65
Poor Man's Space Station	72
America's Best Young Driver	80
How to Shoot 158 Miles Straight Up	88
Finding Fortunes in Uranium	92
How Man Put Light to Work	98
The Truth About Your Brakes. 19	00
Big-Time Telescope Built in Basement 19	05
Wilbur Shaw Drives the Plastic Kaiser1	12
Science Licks the Grasshoppers1	16
Two Pistons in One Cylinder Power Cycle1:	22
Biggest Ship Ever Built	28
Let's Put Some Science in Science-Fiction13	35
How Sailors Learn to Save a Ship1	41
Gus Rides Out a Storm1	H
How to Hitch an Engine to Your Bike1	17

Your Shop Can Save You Money

Put i	R	ad	iato	r U	nder	Cov	er	for	83.	15	54
Make	e #	H	boo	for	You	r Fi	rep	lace		15	56
Put '	Yo	ur	Pic	ture	Fre	mes	to	We	ck.	15	57
Fran	ie '	Yo	ur F	Pictu	res	with	Sic	ling	*****	13	8

I Built a Carport in 12 Hours	160
Husky Drill Drives Quick-Change Tools	162
Kit Makes It Easy to Build a Chimney	164
He Shoots Pin-Ups at Sea	166
Hydrojet Powers Little Speedster	170
10 Uses for Pipe Scraps	174
Guess How These Turnings Were Made	175
The Other Fellow's Shop	181
TV Picture Tubes' 5 Common Troubles	186
How to Build a Tesla Coil	190
Whirling Rotors Lift This Gyro-Kite	197
This Car Flashlight Is Always Bright	204

(More features and departments are listed on page 4)

Editor

VOLTA TORREY

Monaging Editor

HOWARD ALLAWAY

Art Editor

HOWARD C. JENSEN

Associate Editors

Alden P. Armagnac, Devon Francis, Sheldon M. Gallager, Wesley S. Griswold, Herbert O. Johansen, Martin Mann, Herbert R. Pfister, Ruth Westphal,

Art

Bury Samuels (Director), Herbert Anthony, Gene Butern, Henry B. Comstock, Mary E. Dee, Eric A. Karminski Jr., Laylen H. Sweet,

Course

Kendall W. Goodwyn (Director), Carol Ennis, Everett H. Ortner, Tradie Ray, Georgette Sparks.

Photography

W. W. Morris (Director), Hubert Luckett, Orlando Guerra,

Assistant Managing Editors

Frank Rowsome Jr. Robert P. Stevenson

Mochanics and Handleraft Harry Walton

Midwestorn Editor

Keuneth Wylie (Chicago)

Western Editor

Andrew R. Boone (Los Angeles)

Editorial Assistants

Harriet Trowbridge, Stanley Beitler, Judith Ellis, Louise Levis, Teresa Robbins, Rose Well.

Publisher

GODFREY HAMMOND

Advertising Director

STEPHEN P. GLENNON

Circulation Director

EUGENE WATSON

ADVERTISING OFFICES: NEW YORK-353 Fourth Ave.; CHICAGO-360 North Michigan Ave.; DETROIT-820 Book Bidg.; HAN FRANCISCO-114 Sansome St.; CLEVELAND-328 Citizens Bidg.; LOS ANGELES-1127 Wilshire Bivd.

EDITORIAL OFFICES: 353 Fourth Avenue, New York 10, N. Y.

Published monthly at 363 Fourth Avenue, New York 10, N. Y., by Popular science Publishing Co., Inc., Godfrey mainmond President, Stephen P. Glennon, Vice-President and Secretary; stalph H. Flynn, Vice-President and Treasurer; H. C. Wilson, F. W. Briggs, Eugene Watson, Vice-Presidents, Entered as second-class matter Dec. 28, 1913, 10-entered as second-class matter Dec. 28, 1913, 10-entered as second-class matter July 26, 1948, at the Post Office in New York, N. Y., under the act of March 3, 1849, additional entry as second-class matter at Dayton, Ohio, Entered as second-class matter at Dayton, Ohio, Entered as second-class matter at the Post Office Department, Canada, Printed in U.S.A., Copyright, 1954, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all the countries participating in the international Copyright Convention, rearly subscriptions to United States, its possessions and Canada, \$3.00 (2) years, \$3.50; 3 years, \$7.50); foreign countries \$1 per year extra, Four weeks notice is needed to change a subscriber's address, Piesse give both old and new addresse, including postal zone numbers,

CAN'T CHAMPIONS



APRIL 20, 1954

CHAMPION SPARK PLUG COMPANY

SPLENDID PERFORMANCE OF REGULAR STOCK CHAMPION SPARK PLUCS HELPED STUDEBAKER CARS SWEEP TOP HONORS IN MOBILGAS ECONOMY RUN. SCORING HIGHEST ACTUAL MILES PER GALLON AND TON MPG IN EVERY CLASS ENTERED PLUS THE GRAND SWEEPSTAKES WIN COM-FIRMS OUR LONG TIME JUDGMENT IN PACTORY-EQUIPPING ALL STUDEBAKERS WITH DEPENDABLE CHAMPIONS.

> C.K. WITTAKER, EXECUTIVE VICE PRESIDENT THE STUDEBAKER CORPORATION OF AMERIC

CHAMPION SPARK PLUG COMPANY

MAY 31, 1954

TOLEDO, OHIO

POR THE SECOND STRAIGHT YEAR I HAVE DRIVEN CHAMPION SPARK FLUGS TO VICTORY IN THE INDIANAPOLIS 300 MILE RACE. AVERACE SPEED OF 130.840 MILES PER HOUR SETS NEW RACE RECORD. THANKS FOR A GREAT PRODUCT.

BILL VIROVICH



ASK FOR

CHAMPION

SPARK PLUGS

WITH THE EXCLUSIVE 5-RIB INSULATOR

Here's a real performance record! In their 24th Indianapolia victory Champions were the choice for every one of the 33 starting cars. And here's how they came through-

> NOT ONE CHAMPION SPARK PLUG WAS REPLACED DURING THE ENTIRE RACE!

Whatever the year or model of your car, better install Champions for better performance and longer engine life.

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO

AUGUST 1954 3

Major Car Manufacturers



la your service work, follow the lead of several car manufacturers who made comparative tests and found that the sensational PROTO Torquer is faster, sturdier, and more accurate than indicating types. You'll like its automatic torque-limiting release, troublefree construction, micrometer-type adjustment, and lack of pointers and dials. Various sizes are available in foot-pound or inch-pound models, with plain or reversible ratchet head. Start saving precious time now by buying the models you need from your PROTO dealer. Send 10¢ for 68-page catalog to

PLOMB TOOL COMPANY

2257K Santa Fe Ave., Los Angeles 54, Calif.

NEW! Torquer Adapters

These four new torque wrench adapters simplify torquing on overhead valve engines. Their unique

shapes clear obstructions, but do not affect the Torquer's accuracy.

6420

6425



Eastern Factory...Jamestown, N.Y. Canadian Factory...London, Ont.

Rews and Pictures

Giant Gyroscope Tests Turboprops,	77
Bantam Jet Can Tote A-Bomb	78
Britain Leads Us in Atomic-Power Race	85
3-D Photos Fix Accident Blame	108
No Depositor Too Small for This Bank	120
Model Racing Car Has Clutch and Fan:	206

Mechanics and Homebuilding

New for Your Car	152
Calk Compound Cleans Clocks	
Mirror Helps Mother Watch Baby	185
Jeep-Mounted Ladder Gets the Apple	
Trash-Can Stand Keeps Yard Neat	211

Departments

Letters	14
Last-Minute News and Notes	
New Ideas from the Inventors	
I'd Like to See Them Make	126
New for the Handy Man	159
Wordless Workshop	178
New Tools	
Keeping the Home Shipshape	201
New Shop Ideas	207
Craftsmen at Work	212
Hints from the Model Garage	216
How Much Did You Learn?	250

His Pictures Almost Talk



IF ANYONE could make the Einstein Theory understandable in drawings it is Ray Pioch; we just haven't asked him to tackle that job vet. Pioch is a free-lance artist whose knack for making popular presentations of technical subjects has kept him busy turning out work for POPULAR SCI-

Every month you can see examples of

Every month you can see examples of his skill in the "New Ideas from the Inventors" feature, where he translates complicated patent drawings into simple, understandable line sketches. To illustrate "Poor Man's Space Station," on page 72 of this issue, Pioch picked the brains of a physicist to show you what the MOUSE artificial moon would look like.

For relaxation, illustrator Pioch gets far away from his drawing board in his bright red, 235-horsepower convertible,

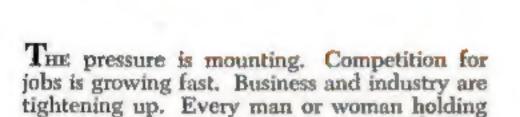
Head Daly

of Plain

Head

Model

For real job security...



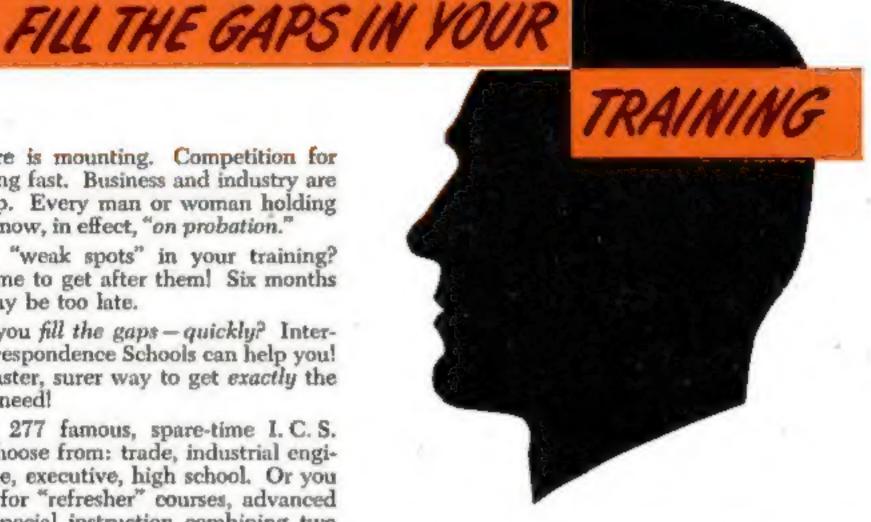
Are there "weak spots" in your training? Now's the time to get after them! Six months from now may be too late.

a good job is now, in effect, "on probation."

How can you fill the gaps - quickly? International Correspondence Schools can help you! There's no faster, surer way to get exactly the training you need!

You have 277 famous, spare-time I. C. S. Courses to choose from: trade, industrial engineering, office, executive, high school. Or you can arrange for "refresher" courses, advanced training or special instruction combining two or more specific business or technical subjects.

I. C. S. has the most complete line-up of jobrelated instruction you can find anywhere. Courses are tailored to fit your needs. This means you waste no time on subjects you can't use. You lose no time traveling back and forth to classes. You set your own schedule-no interference with business or social activities.



Find out for yourself how quickly, how thoroughly I. C. S. can fill the gaps in your training! No obligation. Just mark and mail the coupon!

2 FREE BOOKS

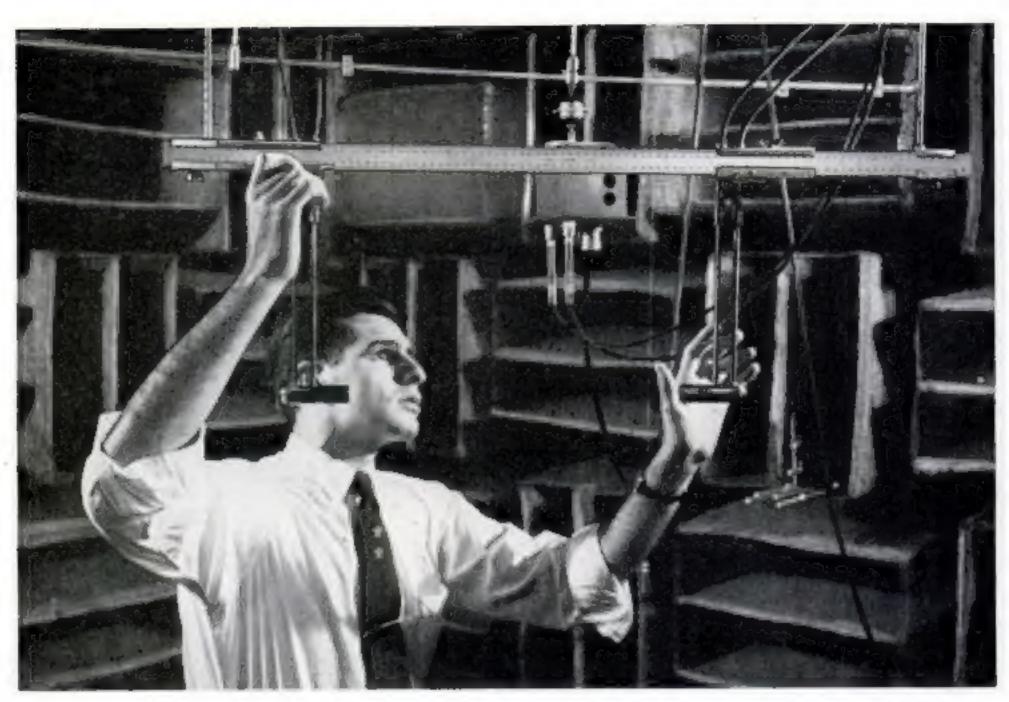
32-page, pocket-size gold mine of facts, "How to Succeed," plus catalog outlining opportunities in field that interests you!

For Real Job Security—Get an I. C. S. Diploma!

I. C. S., Scranton 9, Penna.

Without cost or obligation, send me	AVIATION	poortenity booklet about the field CIVIL STRUCTURAL ENGINEERING	LEADERSHIP	RAILHOAD Air Brakes Car Inspector
Arr Conditioning - Refrig. Architecture Building Contractor Carpenter and Mill Work Carpenter and Mill Work Carpenting Heating Painting Contractor Plumbing Reading Arch. Blumprints Steamfitting ART Carlooning Commercial Art Fashion flustrating Magazine Illustrating Magazine Illustrating Sherchidg and Painting AUTOMOTIVE Auto Body Rebuilding Auto-Engine Tune Up	Asturautical Engineering Ir. Aircraft & Engine Mechanic BUSINESS Advertising Bookheeping and Accounting Business Administration Business Correspondences Certified Public Accounting Creative Salestwesting Festerat Tax Letter-writing Improvement Manageng Small Business Office Management Retail Business Monagement Stees Management Stees Management CHEMISTRY Analytical Chemistry Chemical Engineering Chem. Lab. Technique General Chemistry Natural Gas Prod. & Trans. Petrolium Engineering Plastics Pulp and Paper Making	Civil Engineering Construction Engineering Highway Engineering Reading Struct Biseprints Sentiary Engineering Structural Engineering DRAFTING Annet Drafting Electron Drafting Electron Drafting Electron Drafting Mechanical Drafting Ship Drafting ELECTRICAL Licerral Engineering Electron Drafting ELECTRICAL Licerral Engineering Electron Maintenance Electron Licentracting Licerral Engineering Electron Licentracting Licerral Engineering Electron Licentracting Licentral Engineering Electron School Commercial Good Engish High School Subjects Mathematics	Industrial Supervision Leadership and Organization Personnel-Labor Relations MECHANICAL AND SHOP Gast—Eactric Webling Host Treatment Metallargy Industrial Instrumentation Industrial Supervision Machine Shop Inspection Machine Shop Inspection Machine Shop Practice Machine Shop Beeprints Redrigeration Sheet Metal Worker Tool Design Toolmaking PADIO, TELEVISION Frectionics Practical Radio—TV Engring Radio and TV Servicing Radio Operating	Diesel Londonolive Locomotive Engineer Section Foreman STEAM AND DIESEL POWEN Combustion Engineering Diesel Flor. Diesel Engis Useding Light and Power Stationary Filensin Stationary Stemps Engineering TEXTILE Carding and Spinning Cotton, Royen, Woolen Mig. Finishing and Dyeing Loom Fixing Festile Designing Teatile Engineering Warning and Weaving MISCEL LANEOUS Domissing Refrigeration Marine Engineering Ocean Navigation Shipfitting Short Stary Writing Telephony
Нали		Age	Trans.	
City	Zone State		Working Hours	A.M. to P.M.

Copyrighted misself



In a quiet room at Bell Laboratories an engineer scales off the distance between two condenser microphones during a calibrating test. Able to measure air pressure variations of a few billionths of an atmosphere, such microphones play a crucial role in the scientific study of telephone instruments.

SOUND STEPS ON THE SCALES

Those small cylinders facing each other are condenser microphones—measuring tools that play a vital part in making your telephone easier to hear and talk through.

They are being calibrated by an engineer at Bell Telephone Laboratories to give extremely accurate information on the kind of sound your telephone company handles. Armed with these vital fundamental data on what sound is. Bell Laboratories

scientists devise the instruments and equipment that transmit it best.

At Western Electric Company, the manufacturing unit of the Bell System, a condenser microphone "listens" as your ear would listen to every telephone before it goes into service. The condenser microphone is but one of many precise tools that Laboratories scientists have developed to make telephone service better and more economical.

BELL TELEPHONE LABORATORIES

Improving America's telephone service affors careers for creative men in scientific and technical fields.

NOW... Start Fixing TV and Radio Sets RIGHT AWAY



Cost Instruction Manual Skips "Theories" and "Formulas", Tells How-to-do-it in PLAIN ENGLISH!



Prove It on Your Own Set

Save up to the a year just to installing, repairing, and servicing your own TV set. Book tells which controls by sulpost or tubes to replace if picture is entirely dark - blurred - split - disincled - off center - tilled - warries and wraves - too pale - too black -Ottors - somes - drifts - etc., ste.

PARTIAL CONTENTS

Youls Navded & How TV and Radio Sels Wark & How to Reserve and Scplace Tubes & Testing Tubes without a Tester & Union a Tube Tester Power-Supply Trembles . How In Tool and Replace Resistors, Controls, Switzben, Condensetz, Codle, Francharmers - Tuning Devices - Lond-speakers - Phone Pickups and Norther · Hon to festall and Knowle Am-NORE - - sed MUCH

TELLS HOW TO Cosh In ON THE BIG DEMAND FOR RADIO TV REPAIRMEN

Over 25 million TV or inser the million ratio take countries asserted to the expediture: You co skilled separa mainty mist make play said for (rigents mist whim aris for (rigents fine neighbors in cour spars (nil-m start) year over 1921. Your report against a chstreet, predits. Shock trills the action have to got started; how to stork; where or whalese which return to stork; where to got information; how to make a service call. You can have be make a service call. You can before you, a service. Second, but

Trouble-Shooting Chart Tells Where to Look for Bad Tube IF:

No pictures no resters no sound-No picture: faster DK: no sound

No picture: no raster; sound OK.
No picture: raster OK: sound OK.
Picture wiggles and weaves, lacks
blacks, or is very black; raster OK: sound OK.

Picture litters, double Image; raster OK; sound OK,

Snow on all changels; raster UK;

sound weak.

Snow on all champels, raster OK

sound OK.

Fletore and suster do not hit screen; sound OK.

Picture drifts up and down but not sideways; raster OK; sound OK.

Picture muldy and gray raster OK sound OK.

PLUS 29 OTHER COMMON TO

. . . even if you have never fixed a LAMP or DOOR BELL before!

W hy hasn't somebody done this BEFORE/"
That's what you'll say the minute you start browsing through this amazing new and complete one-volume instruction-manual in radio and TV

For here at last a well-known EXPERT has found a way to tell you in PLAIN ENGLISH how to fix almost ANY radio or television set. (And he even tells you where you can go to have the extra-tough jobs done FOR you . . . at professional rates.) Right from the very first chapters you can start doing simple repairs . . . and before you're HALF way through the book, you can fix HALF the television and radio sets that you encounter. Surprisingly quickly you can fix your own and friends' sets . . . eet a service shop job . . . even start your own money-making business right in your own home.

Why It's So EASY to Understand

No electronic formulas ... no algebra ... no laboratory experiments. Instead you deal only with the things that go wrong in sets how lo recognize and spot the trouble, and what to do about it. Easy as A-B-C directions and 700 clear photos, diagrams, and drawings show you exactly WHAT and HOW to fix, step-by-step.

The author is Associate Editor of Electronics Magazine. He's a long-recognized expert-not only on radio and TV but also on making technical subjects easily understood by the average reader. He has spent FOUR years making this one-volume instruction manual so practical and easy to understand that even a man who never fixed a door hell before will have no trouble.

Here's everything you need to know about where and how to buy tubes and parts, where and how to get a circuit diagram for any receiver; how to choose and use basic tools; how to test tubes WITHOUT a tube tester; how to adjust 58 com-mon TV controls; how to "diagnose" and "cure" common radio and TV troubles; how to fix or replace loudspeakers, phono pickups; how to install and check antennas; and much, much more.

SEND NO MONEY

Examine this big \$56-page book for 10 days BEFORE you decide if you wish to own it. Try it out FREE on your own set. See how easy it makes your handling of repairs. Take 10 days to prove it PAYS FOR ITSELF, or don't keep it. Just mail coupon to: McGraw-Hill Book Co., lac., Days. PS-8, 327 West 41st 51., New York 36, N. Y.

TRIAL COUPON

McGraw-Hill Book Co., Inc., Dept. PS-8 327 West 41st St., New York 36, H. Y.

Pirase send are, for 10 days' FREE INAMINATION, our one values "Television and Radio Repairing," by som Markus, if not delighted with it, I must return took, par nothing. Other ise, I will keep book and product \$1.01 max postage followed by 3 meeting installments of \$2.00 cach.

Names	
Address	

SAVE MONEY. Check here if employing full price of 17 25 u 1714 this curron. Then MI will pay de-livery. Same 18-day return privilege-full return goarntil ced.

ENJOY ALL SPORTS THIS NEW WAY!



NOW Get Close-ups ALL DAY Without Fatigue!

At this SLASHED PRICE, Western Germany's famed binocular-speciacles are the optical BARGAIN OF THE YEAR! Wear 'em tike ordinary eye glasses—hour after hour—without fatigue! Use them to watch BASEBALL, RACING, BOXING, PLAYS, TV, MOVIES! You get CLEAR, CLOSE-UP, MAGNIFIED VIEWING at all times! Featherweight—only I oz.—hardly feel you have 'em on!

See Setter . . . Get Extra Thrills!
Telekular-Specioscopes are a new, truly powerful optical design that gives you greater range than many expensive opera or field glasses and a far greater field of view than some selling for many times more, INDIVIDUAL focusing for each eye—for close-up OR distant viewing!

Try at Our Risk! Enjoy at our risk for 3 days. You

MUST be delighted! Otherwise your money will be refunded with no questions asked! Send check, cash or m.o. for 88c plus 12c for tax & delivery (Total 1.00). Use the bandy coupon below—PROMPT DELIVERY, Send TO-DAY to:

THORESEN'S, Dept. 7-G-90
352 Fourth Ave., New York II, N. Y.
(Considiants Send orders direct to: Thorseon Co., Dept. 7-G-90, 48 St. James St., West, Montreal 1, P.Q.)

"NOW I'M MY OWN BOSS

at Double My Former Salary"

Paul M. De Vita, Former Low Paid Auto Mochanic
Steps-Up Earnings to Over \$100 a Week

UPHOLSTERER

"I can hardly believe how quickly I've gotten ahead in this interesting and productie trade. I was a mechanic making \$55 a week. Now I operate my own shop and make over \$100 a week, thanks to UTS."

WHAT DO YOU WANT? Your Own Profitable Business—A Steady Job—Substantial Sparetime Estnings—A More Secure Future?—They're all waiting for YOU in the Big-Opportunity Field of Custom Furniture Upholstery.

The big nations side better and institutional building boom has created a great demand for trained upnoisterers. Prepare for this big-money trade just as hundreds at LTS raduates have done casily, quickly. You can carn as you learn to make small money all year 'round at home, in your own shop, or in a well-paid job. The aractical N. Y. State-approved UTs tours teaches you professional custom furniture applicatory, reunanteery, slipewers, furniture anishing window curnice, custion, and drapery making. You get—FREE—ALL loois, frames and materials.

COUR FREE book, "YOUR NEW WAY TO A SUCCESSFUL CAREER" tells you all about this fascinating, big pay, big opporunity trade, WRITE TODAY! Training in N. Y. School also available, Uphol-



Prints Postal Cards! 🐄

Send name today for facts and FREE lilustrated Book of unique advertising plans and money-making ideas for your business. Learn how others are boosting sales with post card ads . . . easy with Cardmaster.



Cordmaster Co., 1920 Sunnyside, Dept. 1648, Chicago 40, HL

It's Quick, Easy, Fun To Learn A LANGUAGE by LINGUAPHONE

AT HATE 20 moneter a day reason quickly castly Listin and French, Spanish, German, Ration, Russian, Japanese, Modern Greek Linguist Linguist Linguist Conversational Method. Ovens door to new business, professional cultural and travel opportunities. Send for fascinating FREE book, 'Passport to A New World of Opportunity'

LINGUAPHONE INSTITUTE

147-08 RCA BUILDING

NEW YORK 20, N. Y.

Officialisms



So that you may hear the true miracle of these low-cost high-fidelity recordings we offer

Treasures Yours for only

on this 12-inch long-playing (33% rpm) Pure Vinyl, custom pressed guaranteed HIGH FIDELITY recording

BRITHOVEN'S

5th SYMPHONY

and on the other side

SCHUBERT'S

"UNFINISHED" SYMPHONY No. 8

NOW You Can Own And Enjoy The Best-Loved
Symphonies, Concertos, Operas, Musical Comedies
— ALL AT LESS THAN HALF THE USUAL COST!

HERE IS ALL YOU HAVE TO DO ... mail the coupon below and we will send you — for only 10¢—BOTH Beethoven's 5th Symphony AND Schubert's 8th Symphony—both COMPLETE on one 12" long-playing high-fidelity record 1 We make this sensational offer to acquaint you with the remarkable new program called MUSIC TREASURES OF THE WORLD!

Under this program, you can now own a complete library of high-fidelity recordings of the world's greatest music . . . Beethoven, Bach, Brahms, Mozart, Tchaikovsky, Gershwin — all the great composers, both serious and light! Brand-new performances by world-famous orchestras under eminent conductors like Graunke, Dixon, Hendl, etc. — recorded especially for this brand-new series.

High fidelity recordings like these usually sell for \$5.95 each—but assured distribution to members and mass production high fidelity



pressing equipment enable us to offer these 12" long play records to our members for only \$2.98 each!

HOW THIS MUSIC PLAN OPERATES

Just mail the coupon, together with 10¢. You will also receive, free, the first treatise of our Music Appreciation Course. In addition, you receive an Associate Membership. This does not obligate you to purchase any additional recordings ever! Each month you will be offered a new 12" long-playing record at the special member's price of only \$2.98 each (plus a few cents for U. S. tax and shipping). If you do not wish to purchase any particular record, you need merely return the form provided. And whether or not you purchase any additional records, you still receive, each month, a new issue of our Music Appreciation Course — free! So mail coupon NOW!

MUSIC TREASURES OF THE WORLD, 100 SIXTH AVE., NEW YORK 13, N. Y.

MUSIC TREASURES OF THE WORLD, Dept. 123, 100 SIX	TH AVE., NEW YORK 13, N. Y. PS-8.
Here is my 10¢ as payment in full for the 12" long- playing record described above — plus the first treatise	BOTH—Complete—for only 10¢
of your Music Appreciation Course - which I may keep whether or not I purchase any additional records.	BEETHOVEN'S 5th Symphony
Each month, as an Associate Member I will receive advance notice of the new record release, which I may	SCHUBERT'S 8th Symphony Membership Limited to One Subscription Per Family
purchase at the special member's price of only \$2.98 per record, plus a few cents for U. S. tax and shipping. However, I may decline to accept any or all records	Name
offered me and I may cancel membership any time. It is further understood that I will receive the Music	Address
Appreciation Course - one lesson each month - absolutely free!	CityZoneState
CANADIAN ADDRESS: 1184 Cast	lefield Ave., Toronto 10, Ont.

NEW BODIES

FOR OLD!

I've Made New Men Out of Thousands of Other Fellows...

> "Here's what I did for THOMAS MANFRE...and what I can do for you!"

-Cherly Cittes

C'IVE me a skinny sec1 oud-rate body -- and
I'll cram it an full of hat akome, buse ng new muscle
that your friends will grow
bug-eyed , I'll wake up
that account creery of yours
and make it hum like a bighpowered muter! Man, you'll feel
and look different! You'll begin to

Let No Make YOU a NEW MAN-IN JUST 15 MINUTES A DAY

You wouldn't believe it, but I myself used to be a \$7-lb, weaking
Yellows paried me Skiny G the
made for of me behind my back
THEN I discovered—"Dynamic Tenston," And It turned me into such a
complete specimen of MANHOOD
that today I hold the time "THE
WORLING MOST PEHFECTLY DEVELLIPED MAN"

My Secret—"Dynamic Tension"

When you book in the colores and new a healthy strapped at he we am his book at you then you'll real so less first. Designed Teases to LETS top.

HITTH!

Dynamic Tearies" in the easy NATDHAI method year and proceed in the
prince of your room JUST 15 MINDTEN PARTITY — wite your chest
and shoulder in seles seed; I was a
prince bulge and your wester bely
hatte to be full of my and go! And
your him as or the him his on he now
great allows in the him his on he now
d ton prince high per weekers belowbuilt and Combat reason, etc.

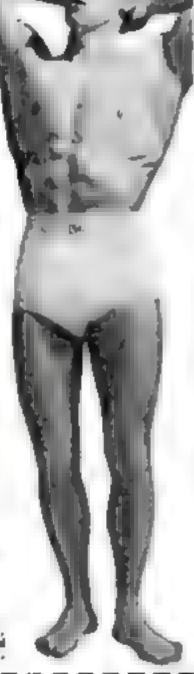
FREE My 32-page Book - Not \$1. or 10c - But FREE

North NOW for my famous book, by close of the state of th

the constant in a feat price for any feel w who wants a better bailed Tel formy area are the form



It may mean the lore int point in y ar who'r I for Rush is required up group at a CHARLES ATLAS, Dept 1-M 118 E. 21rd St., New York 10. N.Y.



CHARLES ATLAS, Dept. 1-H, 115 East 23rd St., New York 10, N. Y.

Send the obsolutely FREE a copy of your famous book. A sector by Meal o and S congret. To page of opposed with at all above of a fine to been, and send by for it does not the gate me. B. Any was

Vante	Please			bb = bl	na na h		. 124
Ashizrere	r reare,	111 1111	***	HIME	-1111	,	
Kullitoria							

317 FOREIGN STAMPS only 25¢



\$9.50 vatue includes:

- STALIN DEATH
 STAMP special
 Idack-bordered issued
- 98 year-old proof of Queen Victoria. Sold for \$5 at apetion,
- ISRAEL complete sheet of first Issaes.

You get all 3 scarce items shown (alone

worth \$7.00)—plus LUNDY, fantastic Puffin Issue from the only private kingdom in the world; BERLIN BEARS, ept, set for Russian Zone; SPAIN, 3 Iberia Airmails; FRANCE, 5 re-issues of 104-year-old rarities—plus hundreds more! Grand total of 317 different stamps—reg. \$9.50 value—for Just 25¢ to introduce our Bargain Approvats. Included FREE, "Midget Encyclopedia of Stamps"—plus Stamp Dictionary and Identifier, Sond 25¢ today, Money back guarantes. ASK FOR LOT EN20

ZENITH CO., 81 Willoughby St., Breeklyn 1, N. Y.



A "GOOD HAND" HELPS YOU SUCCEED!

LEARN TO WRITE WITH

CHASE

Mandwriting onichly improves with our cary-toenderstand pecture leadenst Put your spare time
to good use; send today for O PARE LOOKLET.

Now to Become a Good Penman," or check
reliance wants of below at \$1 backs O Business
westing Activity Mriting Our Westing
Alphabets, COMPLETE BET \$4 80. Ask for
price list of perman's supplies.

TAMBLYN SCHOOL of PENMANSHIP

T. A. Zier, Proc. (35 bigs Bigs, Keene City, Ma., Ma.)



INVESTIGATOR TRAINING

Experience unnecessary,
Many opportunities
Send for Free particulars,
Free credentials.

EXCHANGE SECRET SERVICE SYSTEM 4360 Broadway Chicago 13, Ill.

~	_	-	-	-	COUPON	FOR	dates	ACTION	_	-	-	
E n	chi	MAG	. 1	Secret	Service	Syst	-					

4360 Greedway, Chicago 12, 18.

City . State .

Good Pay-Security-Promotions for You





Let Me Show How You Can Qualify for RADIO-TELEVISION, Fin Spare Time

J. C. SMITH, President SECTIONAL RADIO MERCHANT, WASHINGTON, S. C.,

has trained more men for Radio Television than anyone else You benefit from his 40 years expenTRAINING plus Of paint N. TY, the Part of the office of the ambitious ment for me said you a settle from my course to prove you can keep your job while TRAINING at home in your spare time, for better pay and a brighter future 1 with also send my 61 page hook to show you that Radio Television is today a field of OFPORTUNIT's for property trained men.

Practice Broadcasting or Servicing with Kits of Parts I Send You



Television Growth Making More Good Pay Johs, Presperity

Radio is higher than ever and Television is still growing fast Lonernment Aviation Police Ship, Marrieway Relay Teneway Communics one Systems for buses, take, tracks, rastroads are other growing fields providing good job opportunities and brigh futures for men properly trained in Radio-Television.

Stort Soon to Make '10, '15 a Wook Extra Fixing Sots

You can start to each in fast Many men I train he made have sets, make earra money starting much after they could Mutatescer built with parts, send helps beate and notice; ast triubles. Knod as let have one build action requirement that pressure practical experience with carried common to both Radio and Television.

Mail Coupon—Find Out About Tested Way To Better Pay

Act now to enjoy more good things of the Take NHI training for as lit le as \$5 a month. Many NR gradua as some with only a grammar action education make more in two weeks than the tota trust of my training. Mail coupon today for Artical assess and 64 page think [MPH] FREE & SMITH [President National Radio Institute Dept 41415. Washington 8, D.C. O. R. 40TH YEAR.

l Trained These Men



Extra Money Spars Time.
These money that an and averaged 910 to 5 5 a week appreading Now has a full-time Radio and Television business.
W. L.I. AM. WEYDE, Brock-op, New York.

Out Laid ON, Good Phing
"The taid of my machine shop
job which was he heat thing
that e or happened in me on
Lippened a full-time shop Hun
ness has been pitched up every
work b. T. SLATE, Com-



then for At Station WTOP

I am a sephnician of WTOP I'm
Washington and toke it recy
much Meat o my Rad o
knowledge was obtained com
National Radio Institute

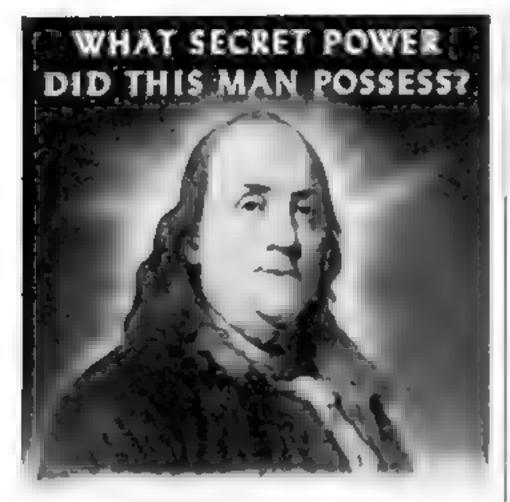
J IN REITTO Ryants
rule, Maryland.

Television Technician

"I am new employed as a Tachminim for a Television Clinic Here I handle only the tough jube that cannot be fixed in he had home NR started me off right." BERNARD BIERS.



K WIN TEAK	Cleanland Phon	
Good for	Both-FREE	The ARCO H
	yte, Washington 4, O. C. n and 61 page Book, FREE. (No	J. dan. DB 9
NAME	AGE	Success un RADIO
ADDRESS		TILDISKI SA
VETS WET OF DAY	ZONE STATE	2



BENJAMIN FRANKLIN (A Rosierucian)

WHY was this man great? How does anyone -man or woman-achieve greatness? Is it not by mastery of the powers within ourselves?

Know the mysterious world within you! Attune yourself to the wisdom of the ages! Grasp the inner power of your mind! Learn the secrets of a full and peaceful life!

Benjamin Franklin-like many other learned and great men and women-was a Rosicrucian. The Rosicrucians (NOT a religious organization) first came to America in 1694.

Today, headquarters of the Rosicrucians send over seven million pieces of mail annually to all parts of the world. Write for YOUR FREE COPY of "The Mastery of Life"-TODAY, No obligation. No salesmen. A non-profit organization. Address: Scribe H F.C.

THIS BOOK FREEL



The ROSICRUCIANS

The R	H.F.C. OSICRUCIANS 1e, California	(AMOF	RC)	
Please which	send me the fer explains how I wers of mind.			
Name.				
Addres				

more jobs than graduates

including to Demand for our engineering gradwater exceeds supply Effective placement! Study in this world famed college established 1884. New term storts quarterly. Approved for Koreon Vers

Bach. Sc. degree in 27 months

Hachen, of science a Mechanica, Cons. Log right throaden, terms of car are throaden, terms of the Administration of the Lag of 1925. The terms of the Administration of the terms of the Courses at Survey 1 g. Braining Secretarial Service Interprete program schedul medianerase accessed.

and so one that native on For carnest ma und students with a time and theight recurre accelerated courses and assist costs. Preparatory ourse.







WATCHMAKING

FREE SAMPLE LESSON Gastern on growing opporfamilies. Study at home or in person with Chicago School of Witchmaking Approved for veterans.

CHICAGO SCHOOL OF WATCHMAKING

2330 Milwauhor Ave., Copt. 484, Chicago 47, III.



BUILD 15 RADIOS

AT HEIME WITH THE PRINCIPLE AND A RADIO "EDU-KIT"

\$19⁹⁵ COMPLETE

All Parts, instructions, Soldering [ron, Tester included Money Back Busrantos

PROGRESSIVE "EDU-RITS" INC. Dept PS-520.497 UnionAve. Bkryn, II N. Y.

Dept. PS-520, 497 Union Ave., Brooklyn £1, N. Y.

Free Oricciptive Untersture—No Obligation Free Valuable Radio and TV Quides—No Obligation.

Address		
CHy	2nne	State



REASON #1. If you were an expert accountant right now, chances are you would find yourself among the highest-paid of all professional men and women. Even back in "depression years," surveys showed that accountants earned more on the average than men in other major professions.

REASON #2. The demand for accountants is great everywhere. All businesses must have trained accountants to cope with ever-growing requirements. It's a profession offering wide opportunity-always-to the man who knows.

REASON #3. You can fit into any business, anywhere in the country—because accounting principles are universal. Think what this means in terms of security and independence!

REASON #4. Accountancy is open to all. Any man or

woman of good intelligence, who enjoys figure work and is willing to follow LaSalle s systematic "problem method" plan, can rapidly qualify for a highly profitable, enjoyable lifetime career . . . and he doesn't have to finish his training before begin-ning to "cash in."

LASALLE 417 S. Dearborn St., CHICAGO 5, ILL.

REASON #5. Without losing a day from your present work, you can prepare in spare hours at home, at low cost, under LaSalle's step-by-step "Problem Method" of learning by doing. This famous plan accounts for LaSatle's remarkable record of having trained nearly 10 per cent of all Certified Public Accountants in the U.S. . . , and of having put many thousands of others into high-paying careers.

Send today for Free Sample Lesson and "Accountancy, the Profession That Pays." Learn about the five great fields of opportunity . . . and LaSalle s time-tested plan for helping men and women to rapid advancement. higher income, greater prestige and professional standing. The coupon below will bring this information to you-without cost of obligation.

MAIL THE COUPON-NOW



City, Zone, State.

Your engine's life depends on a film of oil 4 times thinner than a razor blade!



A razor blade may be only 4/1000ths of an inch thick, but that's 4 times as thick as some engine clearances!

Use high-quality Quaker State for the <u>super film</u> that assures less wear, greater economy

It's A super film! The wonderful protective film your engine gets with Quaker State Motor Oil! Rich, enduring, highest quality, it keeps your engine cool and clean, guards against wear, rust, and acids. Refined from 100% Pure Pennsylvania Grade Crude Oil, nature's best. The product of a half century of specialization in automobile lubrication—it is designed for today's demanding engines. Economical, too—because it lasts longer!

Quaker State Motor Oil is made to suit the requirements of all makes of cars and for every type of service. Ask your dealer.



QUAKER STATE OIL REFINING CORPORATION, BIL CITY, PA. Member Pennsylvania Grade Crude Oil Association



Apologies to St. Paul

Your June issue [p. 76] stated that Minneapolis would be the only American city to see the sun totally blacked out in the eclipse of June 30.

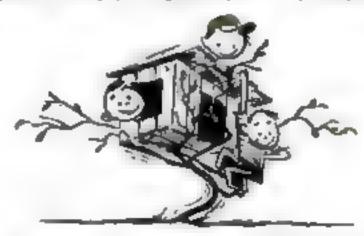
I live within 10 miles of Minneapolis, in another American city, and—as I write this—hope to see the eclipse fine from my own back step.

W. R. GREER, St. Paul, Minn.

To Reader Greer, and the 311,348 other residents of St. Paul, our sincerest apologies for an unintended slight to one of America's great Twin Cities.

Boys Take to the Trees

This is to express our appreciation for the true-life story, "Our Boy Lives in a Tree," that you published in May [p. 93]. I have heard many compliments about it and it has inspired many younger boys in my neighbor-



hood to build a tree house. When they are in their tree house, they are out of trouble, ROBERT L. HARRIS, sec., jumor class, Wilmore High School, Wilmore, Ky.

Tribute from a Skin Diver

I am a very ardent skin diver—a wonderful sport which I took up after reading your article on how to build a diving lung last year. This year I decided to buy a commercial outfit and found it wonderful.

Now, after reading the special section in your June issue [p. 163], I am building

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

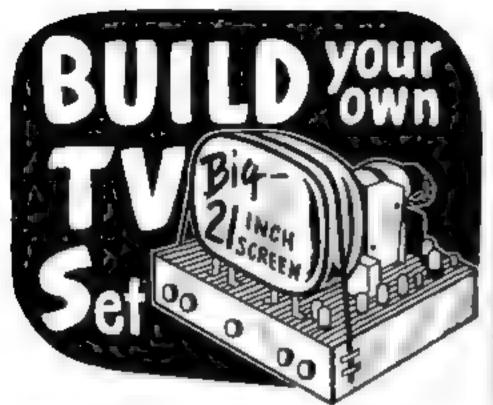
The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

CLARENCE A. O'BRIEN & HARVEY JACOBSON

Registered Patent Attorneys

42-H DISTRICT NATIONAL BUILDING WASHINGTON 5, D. C.



ALSO GET READY for a Big Pay Job or a Business of YOUR OWN

Get the

NOW you can BUILD YOUR OWN TV SET and at the arms time train at home for a BIG PAY job as a TV Tochaician. Or elect a Business of YOUR OWN We sumply Twenty—TWENTY—Kits of Fine Tanks. Quality Parts and Preferences Equipment for your own Home TV Service Shap All these advantages and MANY MORE terms to you as part of America a finest Home-Study TV Training Plan. TELEVISION—Today a finisest graving coductry. Due a place for YOU Thousands of Job Osportunities new owns Or BE YOUR OWN SOSS and HAVE YOUR OWN SUBSTRUCTURE A many thore CTI Men are do no Absolutely so previous aspectance is radio or TV mended. We Irain you in TV from A to 2 B g see FREE Book brings you FACTS and PROOF Rush Courses TODAY!

SEND YOU VALUABLE KITS Hundreds of Parts, Tools, Equipment come with course. FREE BOOK Shows These and MUCH 風色でも Send foday far TOU HOW and TELEVISION Rew TV Brok. facts and figures Also shows twenty big Kits of Paris including svery. Given you latest ELEVISION ing to make your own 21 inch screen CORRER TODAY FREE Sond

MAIL COUPON TODAY

> MANN MARRY MANNE Fine We show you

ne show you now on the state of It is w' hour extra cist. JOB HELP Take your bick

MAYE A BUSI-MESS We show you how to start

County .

COMMERCIAL TRADES INSTITUTE Dept. 71-E, 1400 Greenleef Ave., Chicago 26, th.

Send bly PRFE Book let ug how I can Train at Home and Moke Rig Money in Telev won

Address City State an outfit with hose. I think that it will be more practical than my self-contained outfit for long, shallow dives.

PIERRE BOUCHER, Montreal

How to Quiet a Workbench

That guy who wrote you about putting rubber half soles on his platform rocker to keep it from "walking" [July, p. 8] had a good idea, but I think I've got an even better one. I put rubber heels on my work-



bench. They compensate for slight unevenness in the floor, protect the linoleum on it, absorb hammer-blow shocks, prevent wobble, keep the bench from skidding and best of all-dampen out vibrations, so the floor doesn't behave like a sounding board. ANDREW VENA, Philadelphia

We Get Around

It might interest you to know that nearly 800 students and the staff of our Institute read Popular Science every month. It is read over and over again until the pages fall apart!

> R. A. CAPTAIN, Librarian, S. J. Occupational Institute. Bangalore, India

How to Rein a Rearing Tractor

After reading your article on "How Not to Drive a Tractor" [June, p. 133], I have a suggestion to make in the interest of saving lives. Why not insert a mercury contact switch, on or near the distributor, that would cut out the ignition when the front end rises to an angle of 45 degrees?

G. L. CHAMPAGNE, Convent, La.

We understand that this has been tried but im't a dependable safeguard: a tractor that gets that far off balance is likely to turn on over

A Buick's Life on the Range

About four years ago, I believe, you published a long article with pictures of a specially built Buick destined for the King

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are your laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use inwriting down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

PATENTS • COPYRIGHTS • PATENTS
1424 VICTOR BUILDING, WASHINGTON 1, D. C.

Ranch in Texas [Jan. '50, p. 98]. That article has been a memorable one to me. I was very interested in the special features that were supposed to keep the car in its rugged condition. If it is possible, I would now like to see a picture of this vehicle after it has had four years of service.

DONALD V. DOYLE SIOUX City, Iowa

Here is a picture of El Kineno, as the specially built Buick was named, after four



years and 25,000 rugged miles on the range Gillespie Buick in Corpus Christi, which services the car, reports that while the mileage hasn't been great, the car has had hard workouts in heavy sands, and scatting across open plains, chasing coyotes Engine, transmission, cooling system and special equipment, even including the air cushions, have been standing up very well.

Handy Lady

In spite of being a woman, I followed your April-issue directions [p. 241] and converted my lawn mower to power. No male help, but it works fine.

Now, something for you: To quiet a noisy, "dancing" electric fan, I put a lot of lead fishing sinkers in the hollow pedestal base and poured in melted paraffin. Then I jigsawed out a hardboard base with three rubber bumpers on it. The fan is quiet now.

GRACE HARTT ROSE, Tampa, Fla.

Nice going, Ma'am. A tip, though: It is technically "cleaner" to balance out vibration than to damp it out

Monster vs. Brute

I have a few comments to make about Eddie Yung Jr.'s letter in your May issue (p. 16) concerning, Bob Schmitt's twinengine motorcycle. The Monster, as it is called, clocked 129.87 m.p.h. at the end of a quarter-mile, from a standing start. Mare-

NEW GREASELESS WAY TO KEEP YOUR HAIR NEAT ALL DAY



Outdoors a for in summer? Use Yitalis ... and stay as unruffled as this!

New Yitalis with Y-7 makes even dry, unruly hair easy to manage

V-7, the greaseless grooming discovery now in Vitalis, outdates messy oils. Keeps your hair neat, yet you never have an over-slick, plastered-down look

Vitalis gives extraordinary protection against "summer dryness"—dull, brittle hair, parched scalp. Also, it maintains hair's natural moisture balance better than any other leading tonic

VITALIS® HAIR TONIC WITH V-7



THESE MEN ARE GETTING PRACTICAL TRAINING

ELECTRICITY

ELECTRONICS

On Real:



(Shown at left - Instructor explaining offer from and testing of a large Monte tower are an our A.C. Department)

AND TELEVISION FRADO

On Real:

TELEVISION SETS RADIO RECEIVERS F.M.

(Frequency Modulation)
ELECTRONICS
MECOND CHANGERS
AUTO HADIDS
PUBLIC ADDRESS Systems

tRight—Instructor he ping students the k the oring and fear executing process in receiver



Train in the great SHOPS of COYNE

Largest, Oldest, Best Equipped School Of Its Kind In The U.S.

Whether 17 or up to 45 years of age, prepare for your future now Don't be satisfied with a 'No hatare' job. Train the Coyne way for a better job in a field that offers a world of opportunities in the years sheed.

FINANCE PLAN Enroll now, pay most of tultion later, Part-time employment service while training, if needed.

WE TRAIN YOU IN CHICAGO. At Coyne you learn on real, full-size equipment. Trained instructors show you how, then you do practical jobs yourself. No previous experience or advanced education needed.

CLIP COUPON NOW for big new illustrated Coyne book "Guide to Careers in ELECTRIC-ITY and TELEVISION-RADIO". No obligation; no salesmon will call Get with facts now!

B. W. COOKE, Pres.



FOUNDED 1889

A TECHNICAL TRADE INSTITUTE CHARTERED NOT FOR PROPIT 500 S. PAULINA SI., CHICAGO, Dept. C4-73H
ELECTRICITY & RADIO & TELEVISION & REFRIGERATION & ELECTRONICS

Mail Coupon for Big Free Book

APPROVED FOR VETERANS

B. W. COOKE, President CO YNE ELECTRICAL SCHOOL

\$60 S. Paulina St., Chicago 12, Itl., Dept. C4-73H

Send HIG FREE book and details of your training offer. This does not obligate me and no extension will call. I am interested in:

100	ETT.	EC.	-	7.00	

TELEVISION-RADIO

NAME....

ADDRESS.....

CITY.....STATE.....

1664

This log fire tar at Black gaves full information wit with high district covering

the per contract in ig il-

Diesel Engines, Hydramotla & Fluid Drives Fully Explained.

le of a repairing 1500 Mustrat at a w · views of working paris, with instructions for service jobs.

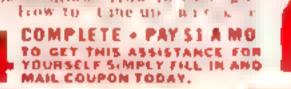
IT PAYS TO KNOW

How to fit pictons—How to locate the rother tags. How to fit connecting rother tags. How to see the actual tears lines -It will be then valves how to

How to adopt earlier tops and et he he How

AUDEL, Publishers, 49 W 23 St , 10 h Y

storch, the heart live to recommendate translates with ignit or treates the winsers. lee distr utors a How to the gobob frow to time up air a c









PAGES

Check NOW!

You Can Look Over Any Guide In Your Own Home

Start the Easy Paymanta II Satisfied

TODAY



dried to be po if I can up to been then on on t
tarbad a burge if the control bear them ages of their \$1 to 7 Days on each hope we set medecad act the first and \$1 to 50 per one of boom or set would have paid by the wine of wines will return thems
A / I CM JBILE W CHAN US GULE \$
H. CK & JOAL VR. DE . 49 PAGES
D Lot EN whe MANUAL 5 o Page
MACH N SET HAN Y BE N 265/ Pages We, "kR's Grint 4 C Pages
BI E PR No REAL N. 4 to Pages
MATHEMATICS & CALCULATIONS, 700 Pages
S ILET METAL PA LEND AT STATUTE PERS
STEEL M. AL WERREN HAN YB TK MEETS
MECHANICAL CRAW NG C GE BE PORT
MECHANICAL DRAWING & DESIGN 480 Pages
AIRCRAFT WORKER, 240 Pages
SAFET MAL WE HAZE HAN YBOK MEETS MECHANICAL DRAWING & DESIGN 630 Pages AIRCRAFT WORKER, 240 Pages TELEVISION SERVICE MANUAL, 384 Pages RADIOMANS & DE, 914 Pages
C RADIOMANS GL BE, 914 Pages
ELEC R C MO R G LE . L FUER
ELECTRIC W FIRE D ACHA! L Pages
ELECTRIC WING DIACHA! Linges ELECTRICIANS EXAMINATIONS, 250 Pages ELECTRIC POWER CALCULATIONS, 425 Pages HANDY BOOK OF ELECTRICITY 1460 Pages
HANDY BOOK OF E. FOTO CITY 1250 Pages
ELECTRIC & CLICHARY, 9000 Terms
ELECTR C LIBRARY, 7000 Pages .12 Book Saft I
MARINE ENGINEERS HANDY BOOK 1758 Pes
SH PERFERS HANDY BOOK " & PAGES
TREFRIGERATION & Air Conditioning, 1280 Pgs.
🗇 MILLWRIGHTS & MECHANICS GUIDE 1200 Pes. 🥫
ELECTRIC D GI(ONARY, 3000 Terms ELECTRIC D GI(ONARY, 3000 Terms ELECTRIC D LIBRARY, 7000 Pages, 12 Book Set) II MARINE ENGINEERS HANDY BOOK 1255 Pgs SH PELLTERS HANDY BOOK 12 Pages HEFRIGERATION & Air Conditioning, 1280 Pgs. MILLWRIGHTS & MECHANICS GUIDE, 1200 Pages POWER PLANT ENGINEERS GUIDE, 1500 Pages ENG NEERS & FREMANS EXAMS 525 Pages PUMPS Hydrau ics & Air Compre sors, 1838 Pgs HENG NEERS LIBHARY 3 Book Se MECHAN GALD C 10NARY 9-1 Pages GARDENTERS & GROWERS CHILES & Book Set)
ENG NEERS & F NEMANS EXAMS 525 Pages
DEPUMPS Hydrau ich & Air Compre sors, 1938 Pgs
T MECHANIFA DIE (ONARY DE DIE
GARDENERS & GROWERS GLUES 4 Book Sel)
CARPENTERS & B LER GG CES 48 ok Se
C I DEFENS B CALLERY OF C MALE AL DESCRIPTION
MANCHA AND B . FRY G 195 4 Bina Set
MA BURERY & MED DESCRIPTION OF ALL ALL AND ALL
■ HOUSE REATING GUIDE, 1800 Pages
OIL BURNER GUIDE, 384 Pages

Employed by _____

mont Speedway was a "drag" strip. Schmitt's cycle was geared down for dig-out, not for maximum top speed,

As far as top speed is concerned, a singlemotored, American-made Harley-Davidson

bake recently hit 170.13 m.p.h.

KEN KIELAR, Chicago

Now He Likes His TV Better

just a word to report how pleased I am with the television remote-control-and-listen-



ing device I assembled in accordance with the data outlined in the article titled "Television as You Like It" [May, p. 216].

KARL T. DREITER, Denver

Lightning-Fast Reader

You reported in June [p. 159] that George Murch of Denver University is capable of seeing 8,000 words per minute pass before his eyes and then score 100 in a test on the subject he has read. That's a lot of literature. It's 133.333 words per second. That's better than "amazing." I just don't beheve it!

DAVID K. MILLER, Trenton, N.I.

Our information on Mr. Murch's feat came from the usually reliable United Press. Obviously, nobody but an electronic brain can read 133.333 words a second—one at a time. But the Air Force, among others, has found that people can be trained to read very rapidly by taking in a great many words at each glance.

Taking Issue with an Artist

Just love that Gus Wilson. His combination of kindness and know-how makes him the Rolls-Royce of mechanics. The illustrator of the June story [p. 160] must have forgotten his Model A Fords, however. They had no oil-pressure gauge. Gus couldn't have made his deduction on the Model A in the picture.

JAY MONROE, Flushing, N.Y.

How do you know that the old boy in the story hadn't bought an oil-pressure gauge from a mail-order house?

"Here's your MOST PRACTICAL way to get an education!"

says I.C.S. graduate T. W. PUTNAM
Retail Sales Promotion Mgr.
Fresh Milk & Ice Cream Division
Carnation Company

"From my experience, it appears that the most practical way to get an education is to study with I. C. S.

"First of all, you study alone, with no distraction from others. You lose no time in travel. Your home is your schoolroom.

"Second, you must know your subject-I. C. S. insists on this.

"And third, the lesson you study thus evening is put to use the next day, increasing your income, your prestige and your importance to the firm you represent.

"I have recommended I. C. S. to many men. And all those who followed my advice have advanced in position and income "

Will you be next to consider Mr. Putnam's recommendation? Here's the coupon to mark and mail!

1. C. 5. is the oldest and largest correspondence school 277 courses. Business, industrial, engineering, academic, high school. Direct, job related. Bedrock facts and theory plus practical application. Complete lesson and answer service. No skimping. Diploma to graduates.

For Real Job Security-Get an L.C. S. Diploma!



3 FREE BOOKS-

(1) 36-page pocket guide to advancement, a gold mine of information on "How to Succeed." (2) Complete catalog authring appartunities in your field of interest. (3) Sample lesson demonstrating I. C. S. method. Mail coupon NOW!

I. t. S., Scranton 9, Penna.

BOX 7687-N. St	CRANTON F, PEHNA.		(Partial flut of 277 courses	
litheat cost of obligation, sund P	to "HOW to SUCCEED" and the o	opertunity backtet shoul the Raid	BEFORE which I have merked X (glas sample ressort?
ARCHITECTURE and BUILDING CONSTRUCTION As Conditioning—Refrig. Architecture Building Maintenance Corporate and Midl Work Estimating Heating Painting Contractor Plumbing Read on Arch. Biosprints Stamfitting ART Cartnoning Communicati Art Fashion cliestrating Magazine lilustrating	AVIATION Agronautics. Engineering Jr. Arrorall & Engine Mechanic BUSINESS Advertes not Bookheep no and Accounting Bouness Administration Business Correspondence Certified Public Accounted Certified Public Independent Managing Smull Business Managing Smull Business Office Management Sales Management Sales Management Sales Management Checklist Ry Analytical Chemistry	CIVIL STRUCTURAL ENGINEERING Continuition Engineering Highway Engineering Reading Struct Bluebrints Sandary Engineering Structural Engineering Structural Engineering Surveying and Magning ORAFTING Architectural Drafting Architectural Drafting Mechanical Drafting Mine Surveying and Magning Mine Surveying and Magning Ship Drafting Structural Drafting Electrical Engineering Checking Engitteering Electrical Engineering Electrical Maintenance Electrical Maintenance Electrical Maintenance Electrical Maintenance Electrical Subjects Good Engith Mathematica	LEADERSHIP Foremarchip Industrial Supervision Leadership and Organization Personnel-Lebot Relations MECHANICAL AND SHOP	MAIL ROAD A Brakes Car Impector Dieser Locomotive Engineer Section Foreman STEAM AND DIESEL POWER Combustion Engineering Name Elec Diesel Eng' Electric Light and Power Stationary Freman Stationary Steam Engineering TEXTILE Card on and Spinning Collon Rayon, Wasten Mig. Effection and Dyoing Linour Fit of Textile Designing Textile Designing Textile Designing Textile Designing Warping and Weaving Miscellaneous
Yaniu		Age	res	
itu	Zone State		Werking Hours	A.M to P.M.

DRAFTSMEN



CASH BIG PAY CHECKS!

Train Now for more success, greater security

LEARN AT HOME IN SPARE TIME (or at college in Chicago)

Check the want ads in any newspaper—SEE the bigpay opportunities open to you as a draftsman. What's more, you can learn this well-paid, prestige profession at home—quirkly, easily! No special talent needed. Get complete, step-by-step Chicago Tech lessons in the mail, spend a few pleasant hours studying each week. In a short time you'll be a well-trained draftsman, ready to take your pick of many good jobs. Act now'



FREE INFORMATION. MAIL COUPON TODAY!
Get FREE TRIAL LESSON plus information about C T C practical training Learn what successful Chicago Tech graduates say about high pay and opportunities in drafting. No charge, or obligation

CHICAGO TECHNICAL COLLEGE

K-222 Tech Bidg., 2006 So. Michigen Ave. Chicago 16, Mileole

Mail me FREE Lesson with information about his oppor-

Inventors

The following are the usual preliminary steps to take toward patent protection.

Make a disclosure of your invention; sign, date and have this document witnessed by two or more people who understand your invention; authorize your registered patent attorney or agent to conduct a preliminary search among previously granted U. S. patents for similar types of invention; secure a report on the probable patentability of your invention and a recommendation of the further course to take.

We shall be glad to send you without obligation our instructive booklet, "Putent Protection for Inventors" and our "Evidence of Invention" discluture form,

EVANS & Co. Marlin M. Evans

REGISTERED PATENT ATTORNEY

940-J MERLIN BUILDING, WASHINGTON 6, 9. C.

PUMP WATER FAST!

DRAIN WASH TUBS, CELLARS, CISTERNS. Famous 47 pumps 2800 GPH. 420 GPH at 75° high or 1600 GPH from 25 well. Shardy.

Trustproof Affoy Metal. Six Blade impeller. Uses any 1/4 to 1/4 H. P. Motor Wiff not teak or clog. Fits any garden hose tramedure money back guarantee. Send Check, Money. 5 95 Order or C.O.D.

RRIGATE, FILL TANKS, DRAW WELL WATER, Heavy duty 48 Pumps 7000 GPN, 1000 GPN 75 bigh — 3000 GPN from 25' well, Rust-proof Alloy Metal, II blade impeller 1" inlet — 1" outlet, Standard Pipe Threaded, Money back guarantee, Seed check, 8 1 195 Money Order or C.O.O.

Free Catalogue -- Gene Pumps -- Deep and Shallow Well Pumps

MOORE MANUFACTURING CO.

INVENTORS

I shall be pleased to furnish you, upon request, with information relative to patent procedure—without any obligation on your part.

PATRICK D. BEAVERS

Registered Patent Attorney

937 Columbian Building, Washington 1, D. C.

DATENTS C. A. SNOW & CO



475 SOON BUILDING.

WASHINGTON I. D. C.



PATENT INFORMATION

Book and

INVENTOR'S RECORD

WVENTOR'S RECORD

GUSTAVE MILLER 84-PS WARNER BUILDING WASHINGTON 4, D.C. REGISTERED PATENT ATTORNEY

ASSOCIATE EXAMINER U.B. PAT. OFF. 1922 1929

Patent Attorney & Advisor
U S. NAVY DEPT, 1930-1947
PATENT LAWYER

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U.S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH

Registered Patent Attorney

205 Columbian Building

Washington 1, D. C.

INVENTORS

PROTECT YOUR INVENTION BY A U. S. PATENT. SEND FOR FREE "INVENTION RECORD" FORM AND "PATENT INFORMATION EVERY INVENTOR SHOULD HAVE".

CARL MILLER

NEW YORK CITY





Reading and heeding speed limit signs can help you...

save up to 40% on your auto insurance!

Read how careful drivers get top-notch protection at rock-bottom rates with

STATE FARM MUTUAL

Do you obey traffic signs like the one in the picture? If you do, here's good news! You can probably qualify for membership with State Farm Mutual—the "careful driver insurance company."

And as a member, you can save on your auto insurance—save as much as 40% of the cost of comparable protection with other good companies!

State Farm Mutual, you see, deliberately aims to insure only careful drivers. Our experience over the past 32 years proves this holds accident costs to a minimum. And we pass the savings back to our members in the form of rock-bottom rates.

Any one of our 7,000 State Farm Mutual agents can tell you exactly how much you can save. And he can fill you in on the many other benefits of State Farm insurance—like our con-

venient semi-annual payment plan. And our speedy, efficient "day or night" claim service.

To find the agent who lives nearest you, look under "State Farm Insurance" in the yellow pages of your phone book, or write: State Farm Mutual, Dept. I-13, Bloomington, Illinois.

Can	You	Qua	lify?
	***	Ti uu	4443

State Form aims to insure careful drivers only.

Drivers who can be counted on to:

- Obey speed laws
- Be alert for emergencies
- Make full stop at stop signs
- Heed crossing signals
- Always signal stops and turns
- Avoid passing on hills or curves
- Avoid mixing alcohol and gasoline
 - Yield pedestrians the right of

STATE FARM MUTUAL



"the careful driver insurance company"

State Farm Insurance is written only by the State Farm Mutual Automobile Insurance Co. and its wholly owned affiliates:

State Farm Life Insurance Company State Farm Fire and Casualty Company

FREE TO MEMBERS

Ask your agent for your new State Farm insigning flike above) in bright red headlight-reflecting Scotchite. Display it proudly on left rear car bumper to identify yourself as "careful driver, soundly insured"... to provide emergency reflection when parked or if taillight fails,

Home office: Bloomington, Illinois. Field claim offices in 315 principal cities. 7,000 agents in 40 states, District of Columbia, and Ontario, Canada

Heat "Jack Brickhouse Sports News" Saturdays and "Cecil Brown News Commentaries" Sundays over Mutual Stations:-Check local radio listings.



TABLE MODELS - CONSOLES - CHASSIS

For its 35th Anniversary Year Midwest offers sensational values in big-picture VHF or All-Channel TV receivers in your choice of mahogany, walnut, or blond finishes with new performance features and long-distance reception. Also new 1955 Midwest & band Series 16 radios and radio-phonographs. Buy your new Television or Radio receiver direct from the Midwest Factory on 36 Days Trial . Easy Torms . . , and at LOW FACTORY PRICES!

COUPON COUPON ON 21 POST	MIDWEST RADIO & TELEVISION CORP. Dept. 241, 100 Brookery, Godinent 2, Ohio
CARD FOR NEW 1953 PROS	ADBIEL
MIOWEST LITERATURE	CITY TONE STATE

ENGINEERING

Big Demand for Graduates

AERONAUTICAL, CHEMICAL, CIVIL, ELECTRICAL, MECHAN-ICAL and BADIO ENGINEERING line, TV and Electronics).

il indred, of young men are a rong # 8. EMCINEERING DE-DREES difficulty in to be seed not at song a stant op-eration. New terms a set of this year area of the part of their cultege expenses in the partie deflectival center.

Low toll on Comment of the transfer of the control of the plant of the property of the propert

Got t appeared for C. L. D. des de the sessions courses Sent ditalieur de tres and l'une se l'une se de De tressembler tenier d'une s'éple donné for fres est les apis fu'il information his est o ex

---- SEND COUPON TODAY ----

INDIANA TECHNICAL COLLEGE

684 E Washington Boulevard

Fort Wayne 2, Indiana

Please send me free information on B. S. Engineering degree in 27 manchs as checked.

Aerengu	f ca . L	Chem-c	al L C	Yel
Electrical, [Mechan	tical, 🔲	Radio-Te	thrision,

Nome.....

Address

the better that are easier to be a carter to be the and lower priced. The Table 51, a 712 has tremended by gathering power and provides by pathering power and growness in the cross clear limates ALL blueculars are both mater dust reson to the COATED! Inside surfaces of vital pt sins and from Alai rear tehromatics are COATED! for brighter sharper sample. for beighter sharper 3-41-1011/P Made in Japan by skilled materal reall men of peccision major a Boys has who becomes are so low



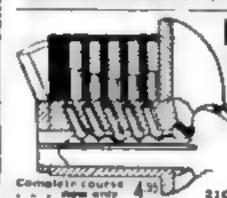
PUTS YOU IN

Earn \$84.00 EXTRA a Month on just 5 Sales a Week!

Gointa has been without spending a cent! My powerfol Fith E Sales K 1 makes steamy to take unfora for Mason's fast selling inc of leather jackets. Your friends relatives outdoor workers will grab these from you paying you like throlts on each order! Just sel and our popular Piecee-brief Louther sacks ets a week, to make \$64 extra income a month! Builder packets of Harrelide, Caperkin leather, Suede. Noon Galantine Wood take orders for I'l doe thee styles for men women, including popular Air-Cushlored work shoes. People MI ST buy from you, because see do not at I through stores?



To start at once, rush postescel for some free money making Saica kit! MASON SHOE MFG, CO., Days, MA 391 Chiapawa Falla, Wisconsin



Locksmithing MAKING Now Made Easy! Practical up-to-

tractics had bon to pick links become consider keys, repair lines i need not pic etc. A warpt in the top leaven for have the price of a need the pick are the pick of the pick are the pick of the pick are the pick of the pi

210 B. Clinton St . Chicago d. III.

TASOPE PHOTO-ENGRAVING PLANTS



MATERIAL COST OF THIS CUT 41 MELLEYS, PRICE

Establish your own profitable PHOTO-EN-GRAVING business. Make cuts for newspapers. printers, and advertisers. Make atched name plates, plaques etc. Instructions furnished, no experience necessory. Sold direct from factory since 1931. First five hundred cuts sold locally or by mail will pay for plant and pay you wall for your time. Write for FREE catalog.

TASOPE, DEPT. PS-4, AURORA, MO.



MANY FINISH IN 2 YEARS

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H S texts supplied Thousands enroll each year in this 57-year-old school. Send for FREE descriptive bookiet.

AMERICAN SCHOOL, Dept. HC 46 Drezel at 58th St., Chicago 37, III.

Without obligation, please send FREE descriptive booklet.

Address ...

۱

Canadian Residents: Complete Canadian Course Available Write American School, 1010 Sherbrooke St., West, Montreal



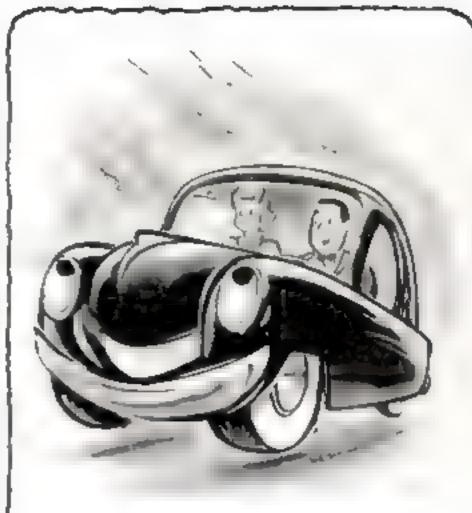
Dejected is Dunkle –

it is his dreadful loss

That he gets nothing more

from car polish - but gloss

So when it starts blowing,
he puts on a duster
And reclines on the hood
to keep dust off the lustre.



How different, Stan Stauncher!
His enlightened selection
Is an easy-on wax that
gives rock-hard protection!

For Bodygard forms
such a shield against scratches
That his car is as safe
as if stowed under hatches!

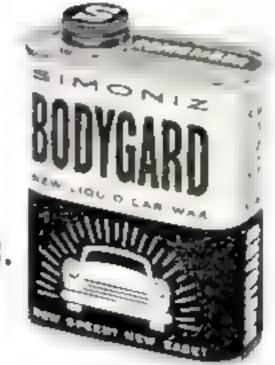
(He feels extra breezy, cause the job is so easy.)

MORAL: Use New Liquid Bodygardthe first, easy wipe-on wax that protects your car with this rock-hard finish. Protects 9 times longer than skimpy-shine polishes.

> YOU CANT SHINE DIRT, SO CLEAN YOUR CAR FIRST.

Every car must be cleaned before it's waxed. Simenix Liquid Kleener cleans better, faster.





True Simoniz Quality in a Liquid Car Wax. Only 985



-even if you don't know a single note now!

NOW It a KASY to learn ANY Instrument, No bording ever see de ghith process this IT ANAN that there out the transfer of And property DV NOTE Bloom a new York Make ghour green to No medal talent in one billion at home to obare to e without a teacher Orle a fest cental er leabt Figure 30 autopies als por e son else 900 000 attailents. (Sing to more soft appressed lights

FREE 36-PAGE ILLUSTRATED BOOK

Just helid this ad, with your name and midress filled in helms to U 8 School of Music. Studio 158 Port. Washington, R. Y No obelgation no salestian wile eaff a

Катали унициализации запри от рас



A hirem STANLEY CUTTING TOOL Reg. \$1.00 Model

Yours as a gift with free trial of amazing new book BASIC HOME CARPENTRY. Over 300 pages, 500 "howto" plans and pictures. Rush card today! If delighted, pay only \$2,95 plus postage—otherwise return book and owe nothing. Ether way, keep the Culting Tool free!





Scarce game no postage stamp as a extrated ports to by the SA respect to the bell's because at most 2 filled of the test States to be a thing of a Commemorative inspect. the them begins and live Some With a man of or Proposition of South and Sout N. E HARRIS & CO. JS48 Transil Bidg. Weston 17 Mass

reck black with a remain a l a read r Free Austra (an Packet 1 6 F on water a series of the serie hair the estamp to our ripe age. App. thus. H. E. HARRIS & CO., 12t Transit Bidg. Boston 17 Mass.



NOW! START MAKING MONEY IN RADIO - TELEVI

THRU AMAZING 30-DAY INCOME PLANS

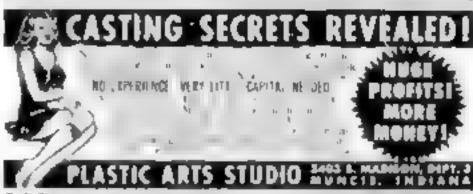
Send for FREE BOOK, FREE LESSON and FACTS on amazing n w hem training p. in

RADIO-TELEVISION TRAINING SCHOOL INC. Oral PS 8, 5106 South Vermont, Les Angeres 37 California

BUILD LUGGAGE AT HOME WE SELL YOUR PRODUCTS!

Only New Home Money-Making Plan in Yours!

Make Luggage and rives for traveling photographers must to retain retraint that put they fill a her flent Also real of Lagrage W and his to ment needed BIG Prof. to We samely He also instruct under everything We to for the definite and Bose example ABARSI CAKE RAFT Dept. auf tite von Bure zur Pan ABARS! CARE H



PAYS HIG SEND FOR FREE, NG. 14408-TRATED CATALOG MOMI similarly reported at high the last the median superior of all in a learn cas is Course to the superior of all in a learn cas is Course to the Sales Property has an are set Appearant leans to reigning a set of a learn to the superior of the World War II and Research Variation of the Sales of the Sales



War II and Kotcan Veterans WEAVER SCHOOL OF REAL ESTATE (Est. 1040) Surte 300 Law Blog. Sept PS Kansas City, Mo.



START AS HIGH AS \$4205 OO A YEAR

MEN. WOMEN

Thousands of appointments be-ing made 36-page 8c on FREE Maliconson To D

FRANKLIN (NST TOTE Set bort Controlled)

Dept. R-BO. Enchange 4, N. Y.

Sr. Bush FREE (1) 36-bage book with list of S Gov't Jobs; (3) Tell gap how to qualify

Saring AL ALL Age A.Address.

FISH'S M-1 CARBURETOR TAKES ACID TEST WITH FLYING COLORS!



ONLY 17 PARTS--ONLY THREE MOYE, no choke, jets, idling system or accelerating pump.

5,000 OF THESE MIRACLE CARBURETORS are undergoing graeling international tests by the inventor's powerful ever-growing organization for developing, patenting, manufacturing and marketing new inventions. The overwhelming tide of comment now flowing in tells an amazing story of astounding Carburetor performance giving the direct lie to those who east doubt upon this truly great endeavor.

HERE ARE REPRESENTATIVE EXCERPTS FROM THE HUNDREDS OF REPORTS COVERING EVERY POINT OF CARBURETOR PERFORMANCE:

ACCELERATION :

'3) HUICK SUPER—It exceeded my expectations by far It eliminated all the lugging name of my engine and exceeded the standard Buick carburetor in acceleration. The todage has increased more than the 20% guaranteed. I'm very happy with it.—M figt. Partain Wagner Benjack, Texas.

'52 Of DR \$2-We found after leating with different cars the Carburetor performs beyond what you have said. I have one of them on my Olds now and have driven it several thousand miles. We are completely satisfied in all respects.—Louis Goulette, Seattle, Washington.

33 FORD 6-1 am sold on the power of your Carborelor as I have checked it on a 30% grade in high goat and sho-crawled up at 14 mph and pirked up speed authori hesitation or a sputter it also want up to exercise at 10 mph and I was bitting 30 at the lop and still accordance ing 1 never broked

'MERCURY—We went over some practy high mountains, one 9,000 fact high the obvious mas 6,000 feet in 18 miles. We had all the necessary power and gas mileage increased by about 10%—Rudulph Ellis, Artesia, New Mealco.

the switch button for climbing gent-Itying Balk, Sytucture

Tracks MILEAGE ST

'5] CADILLAC.—The test was taken under very close check and 1 got a tending of 28.63 per gation,—Tony Martin, Freson. California.

'31 WILL'S - What a surprise I just could not believe it Improvement in performance in terribe, and feel economy is incredible. I figure I'm getting 30 to 25 around town and 30 to 46 on trips.—Arthur II, Ingersoli, Jackson, Michigan.

PERFORMANCE : **

'en DUBER ROADMASTER — Acceleration greatly improved, amounter performance and averaged the mpg while the stock carburetor averaged only 14 mpg. Installed second Carburetor on 33 Parkard with 327 cubic inch engine performed equally as well—DeArmond Leigh, Ashland, Oregon.

'52 PACKARD—Your Carburelor is a wildcat in disguiss and my car using REGLEAR GAS performs better than my slock one did when the car was new.—It is Carney Seattle, Wash.

V Brien

'33 MERCL'RY-I had the M-I set for less and it just flew, at idle I had it down to 355 RPM the lowest I got before was 415 RPM. On starting from traffic lights, the take-off was "out of this world." W Stein Brons, New York.

49 FORD VI 15 Ton Truck-11 (dies as it hade't since I had the truck and it takes off like a tondster when I tomp on it ... Murray M. Durham, KFRG. Falchanks, Alaska.

1

New York,

31 CHRYSLER-Starts line prostorates like a scalded rat.

31 CHMYSEFE-Starts has prostorated like a scalded rat.
40 below when I started it. The first froze so that the flat
aport in them thumped. Son't let anyone lell you that cold
stops a Fish M-L-L. A. McMahan, Badger, Minnesota

Dittar Terride ancieration that overcome numer's former compaint of not starting easily when hot -Paul Darberg, Kent Washington

V

· SPEED «

'57 OLDS 32-We went from standing to 118 miles per hour with very smooth performance - Harold Duncan, Lansing, Michigan

'50 LINCOLN—I intend to put a "Zep Pius Mileage" sign un the buck of my cat because that a all people well see et me on the highway.—George Hotchkiss. San Francisco. California

SMOOTHNESS

'12 FORD VI-The amouthness of the motor is amazing -- Gordon B. Nelson, Los Angeles, Salefornia.

32 OLDS th. They all remarked how the Hydroma is worked so smooth and the continuous pick-up with no flat spots - A C Kutick San Jose, California.

In the U.S. are 48,155 car and truck dealers; 72,452 repair shops; 120,007 automotive retail outlets and 188,253 gas stations. Practically no one in this virgin field understands the M-1 Carburetor. Service must be provided before sales can be made in volume. Needed Now are men with the know-how, brains and guts to tackle this tremendous task. Moneywise the stakes are high, and when the M-1 Carburetor service is completed, other inventions—yours perhaps will be waiting for the magic touch that our organization can furnish.

You will find our story interesting. It's yours for the asking.

JOHN ROBERT FISH

P. O. BOX 1751, DAYTONA SEACH S. FLORIDA

Please send information on your Carburetor and your organization

Name ____

City Zone State

Electro-Magnetic DORMIPHONE

ASTOUNDING Revolutionary REALITY

Multi-Purpose Invention for

Faster Learning

Simplified Home Recording

Superb Listening Enjoyment



Would you like to increase your rate of learning 20 % to 50 % by making use of periods of relexation and sleep? Now it is next you can master a new language, improve your speech memorize a role in a play learn useful facts and figures with less time less effort Would you like to make your own recordings at home- without apools of wire or tape these uses in addition to more listening pleasure but of your favorite records makes the new all in-one Dorm phone the most versatile. 3-speed portable phonograph ever assembled?

Find Out About Electro-Magnetic Dormiphone Proof of what the New ELECTRO-MAGNETIC DORMIPHONE can do for you is fully set forth in a FREE Booklet, "A New D mension in Learning." Write loday DORMIPHONE, MODERNOPHONE, INC. 282-08 RCA Building N Y 29.

Mail Coupon New for FREE Booklet, "A New Dimension in Learning."

MODERNOPHONE, INC. (Dormiphone Div.) 262-08 RCA Building, N.Y. 20, N.Y.

to a sement Rend me your FREE Book at A New Dimension to

if under 18 there here for Special Booklet A

Name

Address

My use it hterest in them phonics to fee disease immersely formed and angular distance for the ment of them. Second as

State

Speech Impervement

Scientific Discovery





SHORTH

Write 120 words per minute Age no obstacle—Lowest Cost

Pamous SPEEDWRITING shorthand. No symbols: no machines, uses ABC's Easiest to learn and use Past preparation for a better position. Nationally used in leading offices and Civil Service, also by executives students etc 120 words per minute—50°, PASTER than Civil Service requirements Over 250 000 taught by mail The very low cost will surprise you. Typing available, 31st Year Schools in over 400 cities in U.S. Conada Cuba, and Hawaii,

WHITE FOR FREE BOOKLET TO SCHOOL OF

33 BOAT PLANS Build the Boat of Your Dreams

Now you can build almost any type of boat-hydroplane racer, cabin cruiser, motor caller, in-board racabout, all jurpose a cop, hot red specialer, mater bite, saling diagnopromiser, and ingresses a cop, not specially and ingress to find the same display the same of the first and the same of photos and step by step construction principles had been been also by step construction principles. SCIENCE & MECHANICS, Dapt. SH 450 E. Ohio St., Chicago I

ail order bu

Your Big Opportunity
to come on their spectrulate profits and thought transfer house of the best many profiters for a sheet sour out to be applicate on a sheet sour out to be applicate on a sheet sour out to EM Pu growing there and there probled a month Money making Ft To ful price the to re-in (Oli pina postage o distar more to pas-graphiced or refund Order Mail Order Con-MELSON-MALL CO. 210 S. Chaton 1 3MW-1, Chicago S. III.

Dept. 54 .

TAN SKINS, MAKE UP FURS OR AT HOME Burds Anomaly Pela r tra

HROME LEATHER TODAY FREE BOOK

N. W SCHOOL OF TAXIDERMY DEPT 2608 Smale. Near

nelional cemera repair school-bert. Per chicagano.

Free to new members of the (atemptional Tradere fould many unusual, usefu products from brance, Japan, Germany and other foreign lands, and trade budetins listing hundreds of import bargains to sell at high buyers for U.S. exports. Oppurtunity mea women, profitable, world wide, mail order business at home, or travel abroad; no capital needed. 2,000 members in 42 countries. 7th successful year FREE details. Mellinger Co., Dept. A. . Westwood, Los Angeles 24, Calif.





employed, start part time Alert dealers can gross \$5 hourty profit on one service ; us \$3 on 6.46 al servi eman frenn, revise multiproof rigs & uphalstery on location. No stop needed Nettaces includingly advertised. Mepent a tomer. East to learn. We locally train and notit you, Quickly established. Easy terms We Hend today for FREE, booklet No obligation. DURACLEAN CO., 4-188 Durnelano Bidg., Boordield, 181.

DON'T YOU

Writing short stories arthress on book was aports It block to bet sharp crefts to be a cube point of the proof of the proo

NEWSPAPER INSTITUTE OF AMERICA SUITE 5724-M, ONE PARK AVENUE, NEW YORK 10, N. Y.



LOCKSMITHING LEARN

Loarn this foscinating, profitable trade from expects in your space time at home! Age or paya in ha dicup no disadvantage. around strady arcome Full or part time. Praction! It arrated lessons. You can make morey every while carnt a All materials and special tools supplied without extra charge

LOCKSMITHING INSTITUTE, Dept. PS-54 PARK AYENUE RUTHERFORD, M. J.

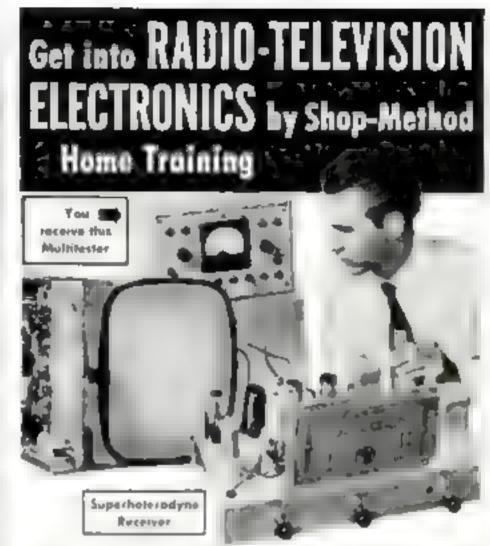
I State floured of Lightedtoon Lar by N depresent for historian

NEW U 738 geiger counter-world s FREE smallest, mas) sensitive a onium ocabooklets on for Ideal for prospecting even on hunting, a fishing trips? (Full line of mineral and metal request (Dealer lacolars, lao

inquiries welcome. I GOLDAK COMPANY 1544 W Glenoaks Blvd., Glendale, Calif.,



Bully de Troing TRIANGLE MANUFACTURING CO., Box 5-32, Fort Scott, Russes



GOOD JOBS AWAIT THE TRAINED RADIO-TY TECHNICIAN I Business of Your Own . Broodcasting . Radio Manufacturing. Sales, Service • Telecasting • Television Manufacturing, Sales, Service « Laboratories: Installation, Maintenance of Electronic Equipment . Electrolysis, Call Systems - Theatre Sound Systems, Police Radio « Garages: Auto Radio Sales, Service » Sound Systems, Telephone Companies, Engineering Firms, etc. WE SRING NATIONAL SCHOOLS TO YOU! There is a place for you in the great Radio-Television-Electronics industry when you are trained as National Schools will train

CESS OF OUR GRADUATES SINCE 1905. YOU RECEIVE PARTS for Signal Generator, T.R.F. Receiver, Audio Oscillator and Superheterodyne Receiver, plus professional Multitester shown above. No extra charges.

you at home! OUR METHOD IS PROVED BY THE SUC-

EARN WHILE YOU LEARN-we show you haw!



APPROVED FOR G. I, TRAINING

MASTER ALL PHASES! Get Master Shop-Method Home Training from an Established Resident Technical Trade School with its own Training Shops, Laboratories, Studios-almost 50 Years of Successful Experience in Training Ambitious Men.

ATIONAL SCHOOLS

Lecumical Trade Licinitud State 1200 LOS ANGELES 37, CALIFORNIA In Canada: \$11 West Hastings Street, Vancouver, B. C.

BOTH HOME STUDY AND RESIDENT COURSES OFFERED

MAIL N	OW TO OFFICE NEAREST	YOU!
-	(moil in envelope or posts on posts) cord) MATIONAL SCHOOLS, Dept. RC-84	-

MATIONAL SCHOOL		
4008 S. FIGUEROA STREET LOS ANOSLES 37, CAUP.	OR 323 W POLE ST	
Please rush FREE RAD FREE LESSON, No obligat	IO-TELEVISION BOO ion, no exterman will	K &
ADDRESS.	BERTHDAY 19	B _
CITY Check if interested ONLY in ferrid VETERANS: Give date of discharge	EONE STATE	





FREE send for it

Everything for Experimenters, Buildors, Amateurs, Servicemen, Hi-Fi Fans

Send for our latest bargain-packed Supplement listing big values and new releases in TV accessories, custom chassis, High Fidelity systems and components, P.A. systems, recorders, FM and AM radios, Amateur supplies, test instruments, builders' kits, electronic parts, tubes, tools and books. Make your selections from the world's largest atocks of electronic supplies at lowcat, money-saving prices!



100 N. Western Ave., Dept. 7-H-4 Chicago 80, Illinois

Send for Supplement

ALLIED RADIO

Success Requires Trainin

this great, modern no istry is acre with opportunities for trained men. Theta after rematerance as a servicing of home and industrial equipment signal catal wheel pay trig tride and become A w mechanism y mented men can get practica tempetics in spare time at home poin what oppen to get bill east

IMPORTANT FACTS FREE — Write today is a control about the a look of the report of the without obligans.

UTILITIES ENGINEERING INSTITUTE, Dept. M. 8

you can learn



by our printen RATION-AL System the ensiest to learn quickly PRACTICAL Spanish as pronounced and used in Latin America Forget the grammar, it is like reading an absorbing story Low tuition cost

NORTH AMERICAN SCHOOL-HOLLYWOOD

NEWS TOO TREE BOOK-NO OBLIGATION

North American & boot Oupt Pi Box 27606 Hollywood 27 Calif.

Send his information on your femous Retsonal System

A property

6 13

Zede State With B Exciting Topical Groups 💯

This valuable imported collection incodes the NEW CROATIA C.P.C. SET of 4 gornes a Indonesia U P U set Rooseve't Memorial group in cluding scarce at raround assess threed National Issue from far off ist rids, sports contests from rictous TRI ESTE, TRIANGLES GALORE, multicelored BIRDS ANIMALS, FLOWERS, PLUS III NORLDS of other fast nat no issues. A total of 322 at different stamps cats loging more than \$6.50 for only 25c to jetrodice our FAMOLS BARGAIN AP-PROVALS. Money back if not delighted PREE: 40-PAGE STAMP DICTION / 5 ARV & GUIDE,

STAMPEX CO., 116-RM Nassau St. New York 3U, N. Y

Men afflicted with Bladder Trouble, Getting Up Nights. Pains in Back, Hips, Legs, Nervousness, Dizziness, Physical Inability and General Impotency send for our amazing FREE BOOK that

tells how you may correct these conditions and have new health and Zest in Life, Write today, No Obligation.

Excelsion Institute, Bept. 8-5, Excelsion Springs, Mo.

ILLUSTRATED RTOON BOOKLET Men, here are the small

illustrated cartoon booklets of comic characters they're telking about 20, all different, (and other offers) sent for \$1 postpaid. No C.O.D.

GAT SALES 446-L N Frior Bt Faul, Mino.





00

wow using NEW pinting kat at a care to enter the and assent some in pinting Meta, and not mere object. Lomp the and not mere objects with intake, copiect, chrome gold cit plus fold data on distribute at the para fold data on distribute at the mean fold data on distribute at the mean fold data on distribute at the para fold data on other time. The mean at the other some fold we have the paragraph of the send \$5.90 now and recover it postpare the paragraph of the





Tax Fron carrying case Made in Japan UNCOMDITIONALLY QUARANTEED.
Thy for 10 days. If not salt-field return for immediate refund Cash orders postpald, C O It a require \$2 00 debook. UNITED BINGOULAP CO. 2043 S Western, C-416, Chicago 20, Design Wanted.



Traffic men sare \$4,000 to \$10,000 and up. Thousands of firms nee Experts on cates tariffs regulations. We train you thorsty in apare time at home for executive traffic jule. Personal training ander traffic authorities. Placement rounces and help. Write for free 68-page book. Traffic Management —the Fact terming Prafection.

EASALLE Extension University, 427 Sq. Dearborn St. A Correspondence institution Deep. HEST Chicago S. III.

Earn \$100 Per Week and up AUTO DIESEL h I old un MECHANICS you have been got lp · n re essay buy and nigh you set. Approved for NEED TO N

NASHVILLE AUTO-DIESEL COLLEGE

224 7th Ave., N. Bopt at

Nashville 3, Term.

Courses in ARTS AND SCIENCES: Philosophy, Education; Letters; Public Health; Medical Jurisprudence, Psychology, Sociology, Physics Chemistry, Gordogy, Pot Science Theology, Law, Business and Completes Accounting, Mathematics Statistics Agriculture EMBINERALMO Science, Accounting, Mathematics Statistics Architectural, Science Pares Accounting to Radio Mituctural, Mang Industrial, Petroleum Befrigers for Pierria. Sent for free cavalog. McKinley-Rossevelt lacorparated, 4618-A3, Sharbian Ed., Chicaga 40, Illinoia

Ball-Bearing



Semi-pneumatic tire ball bearing) \$1.85 1.95 10x1 25 , 10×1 76 2.20 10x2 12=1.75

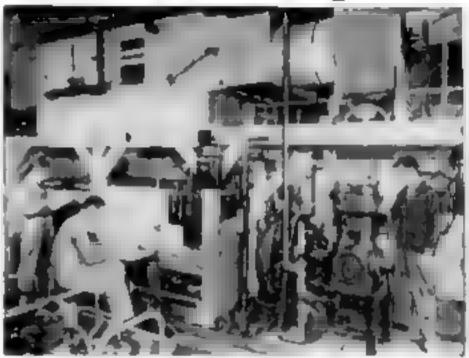
INDUSTRIAL WHEELS

(Luz Base, Semi-Proumatic tice) 10×2.00 . . \$6.10 10×2 78 10x2.75 Cord. 6.90 18.15 1243.00 (Emooth Buse, Presentic tire and tube) 8x3 2 ply 10x3.50 2 ply. 10.55

TOT BROWN LOUS HOME AVENUE PS-854

AKRON IU. ONIO

BECOME A Mechanical Engineer



5. Degree in 36 months



Mechanical Engineers hold respected, well-paying, and highly interesting jobs in many fields of industry. You can prepare now . . for a secure future and a well-paid

career as an engineer or engineering technician at the Milwaukee School of Engineering.

> Choose from these courses at the Milwoukee School of Engineering

ENGINEERING 36 months. Backeler of Science Degree

- Mechanical Engineering with a mojor in Design, Matal Fabrication of Plant Engineering
- Electrical Engineering with a major in Elec-Monics or Power.

SERVICE 6 to 12 months

- · Electricity · Housing
- Refrageration Walding

ILCHWIARE IT IS IN FR

- Rodio and Television
- Électronica
- Electrical Fawer
- Mechanical Technician
- Air Conditioning
- Welding

General preparatory course - 3 months.

TERMS OPEN SEPTEMBER, JANUARY, APRIL, JULY Faculty of specialists. Over 50,000 former students. Annual enrollment from 48 states and 23 overseas countries. Non-profit. 51st year. Military, Practical or Academic training evaluated for advanced credit. Approved for Veterans Training. Write for details today

MILWAUKEE SCHOOL OF ENGINEERING

86	4	-4	ы
	_	7	

MILWAUKEE SCHOOL OF ENGINEERING Dept. PS 854, 1025 N. Milwaukee Milwaukee I. Wisconsin
Send free illustrated career booklets Radio-TV
I am interested in (mains of course)
KamaAprApr
Address
City State State State State State

DIESEL MECHANICS NEEDED

BIG PAY — GOOD FUTURE

Virtually all heavy power equipment is rapidly going DIESEL, creating big paying, steady jobs-through good times or bad-for properly trained men.

Back during the DEPRESSION ... there was a big demand for Bailey Trained Diesel mechanics.

We can QUICKLY TRAIN YOU to enter this big pay field..., no previous experience or special education necessary!

With our method of training you don't spend years pouring over books, figures, charts or graphs -you learn by repairing and operating big Diesel engines, under the guidance of experienced and friendly instructors.

This method of training gives you the experience and confidence that enables you to move right into the BIG PAY JOBS without spending years-as a mechanic's helper. We belp you find part-time jobs while in school-full-time Jobs after graduation. Mail coupon for complete information.

BAILEY Technical SCHOOLS

Veteron Approved

1632 S. Gran St. Louis 4, Mo.

MAKE EXTRA

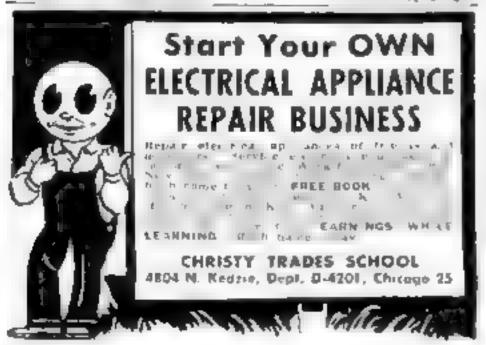
The Care Rich Of a OK LUNATIONS for ME Cand WOLLEN with "know how" in Plactics, Intrestate's new Plactics country fells and show hore to make hundreds of fast willing stems out of Plastics. Given complete training as fabrication, cutting, lamination, mobiling internal curving, etc. in simple ency, FURNITURE they by step language and porture. Plotters and Palescaling Kits for 24 valuable Plante items come with training at no SIGNS ESTRE COOL START A PLASTICS BUSINESS OF YOUR tors. Will No other industry bolds such promise for the SAPS future You ren make by money menufacturing nonalties from night, etc. in your own horse in space or full time Don't went! Learn NOW how Interstate a Plantice. Training qualifier you for naccess on the Plantics field.

> PLASTICS AND SUPPLIES PURPLINED POR 23 VALUABLE PROJECTS

ITERSTATE TRAINING SERVICE

Dept. C-2-H

Fortland 13, Orașon







with 4 towner-low factory prices 50 (b, pat...5 0.48 | 150 (b, pat... \$20.48 100 (b, pat... 13.98 | 200 (b, pat... 25.98 Order by Mailt Ston with order, bal, C O D stra with life over the, C O B, plant

DAN LURIE BARBELL CO. 12-58 Griste| 51 Ocot. 470 H

HOW TO RUN A IRESTAUR

Get Into a Good MONEY-MAKING BUSINESS of Your Own!



Virtually a cubic ete self-instruction course on each of and operating provide language ete in the etem of the self-instruction of the each operating of the each operating the each ope



Start a NEW BUSINESS!

or Add to your gresent Anpale Butlaut

SHARPEN OULL PIPE WRENCHES

PIPE TAPS & DIES "GUM" CIRCULAR SAWS Also MOTOR DRIVEN WOTARY HONE

Write for Information

I. C. MOORE INDUSTRIES Sec. 5 276, Fredenia, Pa.

Free Book on Arthritis

HOW TO AVOID CRIPPLING DEFORMITIES

Explains thy drugs and medicines give only semporary telist and fat to remove the causes tells all about a specialized but surgical. son med as treatment which has proven an exception for his past 35 year, We to for this 14 page FRLE BOOK today

Doot, 36 Soll Clinks

Excelsion Springs, Mc.

I HAVE BEEN AVERAGING \$25,771.16 gross in cash monthly

(Dec. \$31,362 14) for two years in mail order business started very limited capital 1950. Because I can I cover even 1% of market, I can supply you with merchandise, mailing lists, sales letters, advice based on experience. Can be operated on small scale by man or woman. Segon in my home, now employ 23. Send one dollar which will be credited to you. My firm belongs to Chember of Commerce, wall roted financially. Net crazy scheme but legitimate bysiness. No special advection, fraining required. One dallar brings story. Mail Order, P. O. Bek 1715-HP, Dollar, Texas.

LEARN HOW

hast-satting

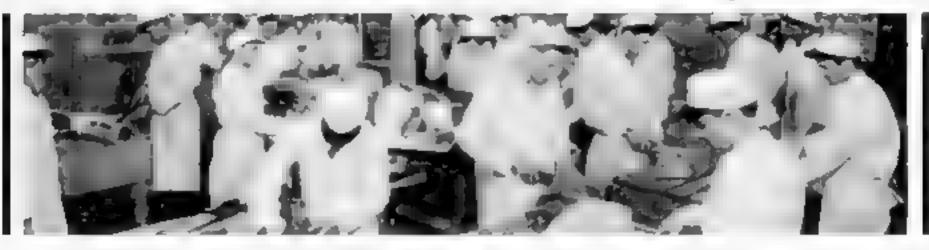
HOVETIES

TENERY

PLASTIC

TO MAKE

LEARN MEAT CUTTING AT NATIONAL Pay After Graduation



The steady dependable trade of Meat Cutting taught easily in 8 short weeks. You LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience, Get . Profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs, Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. National School established over 30 years. Get National training NOW. Pay your tuition in easy weekly payments after you graduate. Get all the facts. Send coupon for FRFE 52 page school catalog-TODAY, G.I. Approved.

National School of Dept 51-M. Toled	Mest Cutling, Inc	:-	
Send the your Fl To'erto n Mean t Meats No of teat	and right Mark Miles	chand of its mid	Training at Self Service
Name			Age .
Address		3	
City	end for training	, Binte Merean Veteran	



repare in space hours for good pay in Tele siston, fis to and blestrories Trate at home with Frank L. Sprayberry America & outstanding Rod o pastractor file bette of Equip-tic 4 furnished filled testers acts etc. 21 stranger and as resulter details and 2 BIG RADIO ROOKS ALL FREE! No

Sprayberry Academy of Radio, Dept. 55-Mi 115 M. Canal Chicago S. Hillings



World's most the Hing hobby - profitable being business. Hingle Grehid plant may multiply into tonay such no valuable house the first Successful home grows above you had been professed untirgue, Cymbridge and have gregore Untirgue, Cymbridgense. Epidemical design, on living-room table. Big profit unders come from friends, neighbors, florists, etc. also the Orders, Ritustrated secrets of the experts in simple "above how" language Amb blooming-size Orthid plants sent at HD HISK Everything you send to that for plantages or public FPEE fall details. SEND No MONEY Weits indep. TROPICAL FLOWERLAMD, Dogs. at 4823 Wilshire, Lee Angelee & Cake.



PREPARE FOR THE BAR

Write inday for your copy of our PILES book, "THE LAW-TRAINED MAN," which down bee the familian Blackstone being study course in har and bustness law. As mersed south selice mate ful furn shed the iding big to a some law in ary the clus of Laws 1.1. (1) do see awarded Malerate tuition easy from by terms Wr. o talay,

225 N. Michigan Ave. Blackstone School of Law Founded 1890 Dept. 129-C. Chicago I, Illinola





WIX Oil Filter Cartridges provide the watchful care over lubricating oil that means car engine health for you ... WIX filters out all the grit and dirt your oil collects in use, giving you constant engine protection and maximum oil mileage.

ENGINEERED FILTRATION

WIX HEVI-DUTY Cartridges far exceed engine manufacturers' specifications and are especially engineered for your individual engine. In taking out more contaminants they still preserve the detergency in today's heavy duty oils. Ask your Serviceman for WIX . . . you'll keep your oil clean, your car engine well lubricated and really healthy. You'll like the careful nursing WIX gives your pocketbook, too.



WIX CORPORATION . GASTONIA, N. C. IN CANADA: WIX ACCESSORIES CORP. LTD., TORONTO

TUBE FREE WITH EVERY TIRE AT NO EXTRA COST BRING YOU THESE TOWEST PRICES SUMMER SPECIALS— WHAT BOOD IS A TIME WITHOUT A TURE!



WHY PAY A TIRE WITHOUT A TUBET
WHY PAY AM ESTABL SHED POLICY OF CAREFUL SELECTION ASSURES TOU MANY
MORE! HAPPY MILES BE WISE-TRY ONETOU LL SUY MORE! WE WELCOME
COMPETITION ING ONE CAN TOUCH
GOOD USED TIRES NOT RECAPS NOT RETREADS
PAKE THE 10*, DISCOUNT WE OFFER
A PUT MONEY IN YOUR POCKET!
EVERTOODY 10*/ Off ON EVERY
MAY TAKE
20 MONTHS WRITTEN SUARANTEE

43 670x13 3J 75 700x16 \$4.45 750x16 \$4.75

95 76D#13 it you buy 3 Passenger fires, we DIVE the

4th Fire FREE with 12 mos, guarantee 500 craffel in Truch Tury - Sciented for Toughest Jous - Took in Value 32 mos. Written Quarantee 14 mos. Written Quarantee 14 mos. Written Quarantee 1600 to 55 05 175 to 55 15 700 kt 5 5 8 45 750 kt 0 10 12 05 600 kt 6 6 750 kt 7 750 kt 6 750 kt 6 750 kt 7 750 kt 8 75 750 kt 7 10 35 625 kt 7 17.55 650 kt 7 10 35 625 kt 7 17.55 750 kt 8 750 kt 7 10 35 625 kt 7 17.55 750 kt 8 750 kt 8 10 45 750 kt 8 750 kt 8 750 kt 8 10 45 750 kt 8 750 kt 8 750 kt 8 10 45 750 kt 8 750 kt 8 750 kt 8 10 45 750 kt 8 750 kt 8 750 kt 8 10 45 750 kt 8 750 kt 8 750 kt 8 750 kt 8 10 45 750 kt 8 750 kt 8 750 kt 8 10 45 750 kt 8 750 kt 600x1646 6.35 640x26 4 72 730x16.8 6 61 730x20x10x12 06 650x1646 7.05 710x15 5 25 750x17 10.35 625x20 17.55 700x16 6.15 760x15 5 25 750x17 10.35 625x20 17.55 700x16 6.15 760x15 5 73 750x18 10.45 900x20 17.65 750x16 3 35 820x15 6 05 825x15 10.45 900x20 17.65 750x16 3 35 820x15 6 15 600x20 8.75 1100x20 17.65 850x17 4 25 670x18 5 05 650x20 9 55 1100x22 17.65 650x17 4 25 670x18 5 05 650x20 9 55 1100x22 17.65 650x15 7.05 32x6 10 10 52 1000x22 17.65 650x15 7.05 32x6 10 10 52 1000x22 17.65 700x15 5 15 700x16 0 7 15 32x6 10 12 95 1100x22 27 35 41.65 WHITE WALLS \$1.00 EXTRA Ni.1aty Treats 750x20 14.65 760x16 of tires shipped 31 over the U.S.A. All tires shipped 6 0 0. Philadelphia 20 December 10 Decemb

STANDARD 834 N. Broad St., Philadelphia 30, Pa.

When YOU talk—Watch The Expression on People's Faces!

> Amozing Training Method Quickly Halps You Develop Confident, Self-Assured Volce Proof of the interest by the notiful of your to a called favorable or unfavorable. A natively the parties of the action of the second some allows a sum of the second some attack, or we prove life as parties that all effects to appeal the annual bases of the second some camp to a second some while the total process of the second some of the configuration of the second some and the second some and the second some and the second some and the second some second

PREFECT VOICE INSTITUTE

Studio HW-L

210 S. Clinton St. Chicago &. III.



EARN \$5\$\$58 at HOME DURING SPARE TIME, Wonderful new Home-Business opportunity! HELP US FILL HUGE DE-MAND from 20 million hobbying. Some Rare beautiful multicolored species sold for \$75 PR. AND MORE. It's easy' It's fun' WE SUPPLY EVERYTHING YOU NEED. Wate for PREE plan, reprint, folder and all the details. Please state your age TROPICAL FISH BREEDERS OF AMERICA, Dept C8. Los Angeles 15, Calif.

PLYWOOD BOAT KITS



TAFT MARINE WOODCRAFT

634 39th Ave. N.E. Minneapolis 21, Minn.

PLASTIC LAMINATING AT HOME!

man-do work to SPARE TIME at home or expand into FULL TIME but

Send coupon for Free facts shout the newest. and most fascinating of all home operated businesses. For the first time a simpafied machine brings the fabelous profits of Plantic Society and Plantic Laminoting within the reach of the small operator. Anyone can learn to operate the machine with few minutes practice - then with our Magic Mail Plan can get mall orders pour-ing in daily with cash in every unvelope, No conventing no sailing. We even

supply the circulars you mail to bring back cash and orders. Don't waste a minute Rush your name. We'd send you FREE and postpaid, pictures, prices details and a I the facts you need to start. Mail coupon or send name on postcard. No charge. Warner Cleckic Co., 1512 Jarvis Av., Dopt. L-1-J, Chicago 21, Itlants

Make Thousands of Beautiful Art Cri

COSTUME JEWELRY . CIGARETTE BOXES THAYS . CANDLESTICKS . COASTERS LAMP BASES - BOOK ENDS...ALL IN SPARKLING COLORED PLASTIC



WARNER FRECTRIC CO., 1512 Jaryle Av., Dept. L-9-J. Chicage 26, til At no cost to me, pirase rush complete details postage prepaid, I am under to obligation.
Home
Address
CitySonsState

MAR

is taking out of

the machine a Plastic Senting, Job - ordered by mat. - only ile in material cost brings back \$2 58 in cash by mall Capacity of machine: \$28.00 profit perhous of operation.

AUTO COMPASS

Rejoy travel ng with America's film of Attent Cuttetons Accorate desemble of the free U. k.v. and consent-te afficiel att any cur. k.w. - 17 LPD-Umonthed on any car the one of an a Processing for the only companies approval by auto materials. Rather Companies and name of general dealer

Quide Way to 48 Gintmais Instrument Company Non Illuminated IEL4-33 Kelso St., Filmt, Mich.



your own JET ENGINE!



Order those plans today

1. JET PROPELLED BILYCLE Assemble poor news. Photo and instructions 31 M. I HOW TO MAKE 1 XPs 112Mt NTAL JET LNG INES. Seven shorts drawings with lactorations 12 9° 3. 207ff OF ARITH E to one order \$3.75. EFNO NO MORE DUNCY Order both at mare 13 75 C O D in 1 SA plus c o.d. product, 3 and check of Money Order and we pay pools pay, Get other information too, Right Order.

J. HOUSTON MAUPIN, Dept. 66, Tipp City, Ohio

TRAINING ASSOCIATION, RADIO-TELEVISION Dont. F-BH

and illustrated

booklet



We'll send generous collection of hard-to-get mint and used) Elizabeth stamps, Coronation and others — Falkland Islands, Ceylon, Seychelles, South Africa, Tristan da Cunha - many others, PLUS! FREE copy "Stamp Collectors Guide"! FREE color copy World's Resent Stamp! Other offers for
your free inspection, Rush name, 10¢ for postage and handling - Ismited time offer! GARCELON Stamp Co., Dept. 8PS 6 Calais, Maine.

ALL VETERANS DISCHARGED REFORE AUGUST 20, 1952 must be eprofied and IN TRAINING by August 20, 1934, or less G I, rights to a free education under NFW G I, bill, We train you at home to become a trained TV Technician—good pay and a bright future in TV! Time is short, Send for 4 FREE AIDS and details! (Non-veterans too!)

\$2 8 19th St , New York J, N. Y.

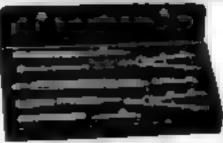
WEISE for FREE CATALOS with 14 LIDIS SAMPLE CARD Thousands of Customera

GUALITY READING-MAGNIFYING OR BIFOCAL GLASSES FOR FAR AND NEAR DVANCE SPECTACLE COMPANY. Inc. 5. Bearborn St., Dept 57-8 Chicago S. Illinois

This PRE Book Led Me To Success In Says: Phil DeCapite, Engineering Draftsman



IT & EASY IN YOUR SPARE TIME AT HOME I wanted to get in un the b a money and success that endustry is offering eng neering draftsmen. I'm sure and sent in the C E I coupon Becoming a draftsman was a tinch with CEI training and teaching And if a could do it to can 700 Send for the Suc ress Book leday



Get This Professional Set at NO Extra Cost!

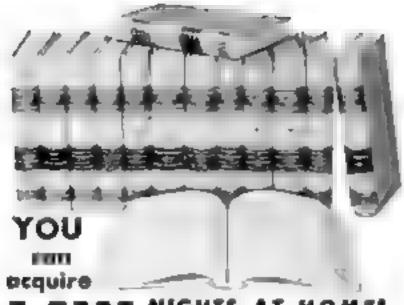
SUCCESS BOOK-

| Cleveland Engineering Institute Extension Division PS-8-D \$300 Euclid Ave., Cleveland 3, Ohio I) Mechanical () Agranautical

NAME ADDRESS CITY . STATE.....

No Obligation — — No Salesmen

AUGUST 1954 37



NIGHTS AT HOME! L L.B. DEGREE

LaSaile's famous Law Library—used as reference in many Law libraries and Law officeshas enabled thousands to moster Law surprisingly fast, in spare hours at home, for business and professional advancement.

These 14 remarkable volumes, compiled by leading professors and lawyers, cover the whole basic field of Law in condensed, orderly, sim-

plified manner.

You advance rapidly with this great library, plus special lectures furnished. We guide you step-by-step with personalised Problem Method of instruction . . . you learn by doing-handing legal problems—not by memorising rules.

Send for two FREE 48-page booklets, "Law Training for Leadership," and "Evidence," answering questions about Law and its value to you, and teams how LaSalle Law graduates are winning rapid advancement in business and public life. Mail coupon below. No obligation,

LA SALLE EXTENSION UNIVERSITY A Correspondence Institution

417 S. Dzerbern St. Dept. 883L Chicago 3, 18.

Send me your two PREE booklets described above. without obligation.

Materia	 and the same of the same	
en.		

Fity, Zone or State.

Paint STRIPES with Now PAINT PEN

Makes Straight, Curved or Parallel Lines!

Just fl. glass e al with any color paint. Use like a fourtain pen to stripe furniture, blaca, autos, model p anes, toys, lineleum, wall board Beaut ful. clean, crisp results every time, die professional painters. No experience needed to draw straight, curved cireular or evenly spaced paral el Inva Can't clog or smear May also be pard with gide tempera, testile paint, or ceramic underginger Paints on wood giass. plastics, metal, fabries and paper Lasts a lifetime. On y \$1 postpuld, complete with tip for 1 16 such stripe. C.O.D. a plus postage. Paint Striping fool TODAY!

New! "DOUBLE-STRIPE" MODEL Only \$2.95

Newest paint striping invention Makes Dot/BLE stripes - one wide and one parrow or two wide or two narrow at the same time. Or adapt quickly for wide or narrow single stripe, Makes 5 com-binations, Fas g Send posttard for complete information ... or order now. . . EZ.96.

DEALERS Muster Pales Striping Tool packed In Display Cartons of I dozen Fast profitable seller. Write for discounts. Attention All Home Craftsmee!

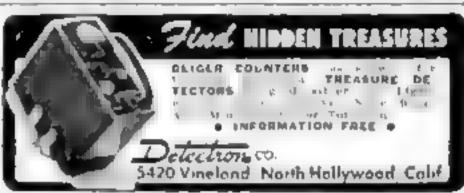
New Paint Striping Tool gives "professional" resu is every time, protespendial resp to use an a frontale sen Adjustable quide herps 'mee at rainful de an accur Justin sant le make curry of freehand designs Adds new hearty, finished look to everything you paint Scod \$1 new.

WENDELL MI'G, CO., Bept. 2-J 4234 Lincoln Ave., Chicago 18, Many

6 Other Complete Tools Complete tools for , 64.1 22 2 64.5 64 3 32 or 1 6 inchastripes, 11 50 each, Extta tips 75c en. COMPLETE KIT with ALL 7 TIPS. 65 00. (A set C'tip, noly \$1 00) All tips interchangeshie.







CUT & POLISH

FOR FUNI FOR PROFITE

- Professional Secrets Revealed New you can quickly fourn to out and polish pem stones angity -at home B-I G one volume course overs every detail-where to find pome-how to turn them into precoud Jawele with law cost equipment Complete course (with FREE coupon redeemable for full purchase price) only \$2.00. Manay-back quares les :

GEMLAP 1265 W. 76th St., Cleveland 2, Ohio

Catalog or 3000 Novelties 10c

send 10c for amazing catalog of neveltles, live animals, scientific supplies hobbles, funmakers plends & boats, isoms, magic tricks, jobe articles, unusual speeds, oadspet Timesavers, cameras, optical goods, are scient, mevies, lucky provery, refigious nove ties, disguises, mevies, lucky provery, refigious nove ties, disguises, mevies, testruments, stamps coins, succies, fortune teriers, radies, gutp & bits accasseries, te satepes, magnifiers, compasses, banks, smotors' gadgets, artists' supplies, printing sets, engineers, thockers, he ves, hillfulds, fireworks, suns, riffing, provide boats, games, plants, the Boats Sames, address & JOC for the country of th JOHNSON SMITH & CO., Deet. Bit Detroit 7, Michigan

I'll Send You This Handsome SAMPLE CASE-FREE

WRITE for the FREE To loring Sample Case packed with 150 beau. Cfm big value suft and overcome fabrics. Take orders from Science, for file quality made to measure clothers, for file quality made to measure clothes. Poster big real profits in advance, Because wearing our sufficient average more orders we stake it easy for you to set your own clothes without it cost. No experience is needed. SATISFACTION EUARANTEED, SEMP NO MCNEY Rush pour more, address and sun-trains.

and Show You How to Make Up to \$30.00 in a Day

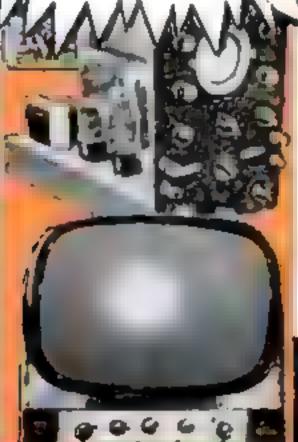
A.C. FIELD & SON, INC., Harrison & Throup Sts. DEFT. P. 1729 CHICAGO 7, ILLINDIS

Take your Short Cut to HIGH-PAY JOBS or BE YOUR OWN BOSS IN TELEVISION



TOOLS AND EQUIPMENT

UTL sends you everything you need for successful Home Trainyou keep, convert any table it to Enjoy doing hundreds oratory . of thrilling experiments and interesting demonstrations. Build professional equipment to use in your career including a volt-ohm-mil.inmeter 6 0001plote superheterodyne receiver a cathody ray oscilloscope and other valuable on to Practice



FOR SUCCESS AS A TV TECHNICIAN IN

Are you looking for employment opportunities with a FUTURE? What are your chances for promotions or raises in your present job? BETTER TOURSELF., ... train NOW for profitable jobs in the booming Television Industry. Thousands of top jobs are awaiting the Trained TV Technician. HERE IS YOUR BIG OPPORTUNITY IF YOU ACT NOW!

MANY UTL TRAINEES MAKE \$25 A WEEK

IN SPARE TIME, while still in training The money they cam for repairing TV sets and radios for neighbors . . . assisting service shops and distributors, more than paid for the training and permitted them to enjoy many of the luxuries in life. UTL SHOWS YOU HOW!

TOU ARE READY TO TRAIN AS YOU ARE!

You don't have to know the first thing about electricity or television at the start, to master UTL Training Step-by-step instructions TELL you how- thousands of pictures, diagrams and charts SHOW you The finest equipment GIVES you the Know-Age or experience is not important . . Just your AMBITION

No Money Down!

Start your own profitable servsee business immediately after graduation without putting one cent down for equipment, stick parts, and tubes. Get the smaring details ACT NOW OFFER LIMITED TO FIRST COME, FIRST NOW SERVED.

NOTE TO MEN PAST 40:

If you find it difficult to get ahead here is your opportunlly to be independent and have your own thriving business.

UTL has Successfully Trained Thousands

Amazing Training Program has caused gradunter to say UTL training was responsible for their getting ahead no fast trainees report UTL fraining is the essent thing they have ever done! Training is professional and emyou are treated as a person, on an individual basis.

TRAIN AT HOME set your own pace. and equipment sent you. UTL builtuctors give you full assistance. Your training is remarkably EASY Upon completion, you

TRAIN IN UTL LAB. for 160 hours of VANCED TV EXPERIENCE! You operate modern equipment found only in a lab, do Interesting trouble shooting assignments the professional touch by his a c accepted Th tircuits, equipment and stardards

JOB PLACEMENT SERVICE and BUSINESS PLAN IS AVALABLE with the complete four training Excenss t record Photo out for yoursen!

COLOR TV TRAINING INCLUDED

Exciting profitable COLOR IV is now a commercial RE-ALITY Industry leaders predict that in years to come COLOR TV WILL PRACTI-CALLY REPLACE BLACK AND WHITE TV' UT training prepares YOU to take full advantage of the HUGE field of black and white TV NOW

position to EXPAND WITH THE RAPID GROWTH OF COLOR TV

This means ADDED OFFOR-TUNITIES FOR YOU with UT TRAINING. ACT NOW get in on the ground floor of COLOR TVI

DON'T DELAY-MAIL THIS TODAY



with at that op on how to go high pay jobs in TV easy it is to truth, how to bu dup prestige and income at the same the how to take advantage of POUR SOPE Huthdars,

MNITES T	FIFYISION	LABORATORIES,	ler.	Dent SSAA
		ets, Louisvelle J,		
Send me	the big v	aluable 48-page	book	of Oppor-
Ctaral Liden.	FREE! I	Understand I	Man	under no

Name			
Address			
City	Zon	eBtale_	
Married.	Single.	Age.	
PLEASE SEN		INFORMATION	ON-

Owning my own business Television Studio Techniques How to get a high-pay job in TV





BE POPULAR + AMAZE + ENTERTAIN

Learn to apply Hypnorism and Autosuggestion in short time, by 1023De ing at home, with GUARANTFED RESULTS — DON'T DELAY Write to America's oldest, most famous Hypnotic school for COUPON free information - now - to-AND MAJL

SCHOOL OF APPLIED HYPMOLOGY 129 Central Park South, N. Y. 19, N. Y. Please send me Free information:

ADDRESS

BENT IN PLAIR WHAPPER

FILL

IN -

MARIE

CITY STATE

IMBURANCE POLICY given with each used tire sold. We guarantee the amount of service you pay for.

AIRC CUMLL

More

DATES

SPECIAL! Doduct 10° o o n proces for Two or

Used

Tube Given Pres with Each Used Presenter Tite Upon Heaten LOSE!! Super Quality - Rugged Performance - 15 Manths Insurad Service 670115 670116 95 700-16 08 710-18 4 15 760×16 54 75 4 98 700-

Supreme Quality -- Hothing Finer -- 30 Months Insured Sorrice 500-16 59 25 475R10 55 49 700-15 10 45 700-20 612-50 600-16 59 25 475R10 55 49 700-15 10 45 700-20 612-50 600-16 5 75 440-15 4 92 750-21 10 92 750-20 6 15 30 6-0-16 5.75 6-70-12 5 35 700-27 11 93 750-20 6 17 50 650-16 4 7 25 710-15 5 45 750-27 16 45 925-20 21 50 700-16 4 35 760-15 5 45 750-15 10 95 800-20 19 95 750-16 4 93 800-15 6 15 30-5 11.25 1000-20 20 45 550-15 4 93 820-15 6 35 600-20 10 95 1100-20 21 25 550-15 4 93 820-15 6 35 600-20 10 95 1100-20 21 25 550-15 6 25 6-70-16 5 15 32-6 11 19 1100-22 22 78 700-15 8 36 700-16 10 25 32-6 11 19 1100-24 28.88 Whitewalls \$1 00 sates

TIRE SALES

Spredy of to on Mat op Mat Oplers, F.O.B. Chicago, such with a number Deduc INC.

3701 S. Hermal, Dapt SS 22, Chicogo 9, 1(),

100 POUND SET \$**9**.80

Postes Only 100 Puend

This is but feature set and in the finest every The tip and adjustable weight a true NEST was been the supported by the support of the support of a support of the support of

SEND FOR FREE CATALOG. BUR BARBELL CO. Lyndhurst S, New Jersey

GEIGER



Super-comitive! Only 14 lbs.) Fits pocketuses floshight battery. Find a fortune in ven-nium. Order Maw! Send 35,00, balance C.O.D MONEY BACK GUARANTEE FREE CATALOG - scintillator and larger uranium and metal detectors. DEALERS WANTED.

PRECISION RADIATION INSTRUMENTS 2235 PS & LA BREA, LOS ANGELES 16, CAUF.

ADDRESS & MAIL POSTCARDS AT HOME ecce BOX 9, WATERTOWN, MASS.

WHEELS WHEELS

7' Dinc Wheel his Tire hy theeve 45c ea.
6' Dinc Wheel 12a Tire hy belt bearing 70c va.
7' Disc Wheel 12a Tire hy balt bearing 51 00 ca.
6' Disc Wheel 12a Tire hy balt bearing 51 00 ca.
6' Disc Wheel 12a Tire hy balt bearing 51 00 ca.
6' Disc Wheel 13b temi-preum Tire hy 6.6.
10' Disc Wheel 175 semi-preum Tire hy 6.6.
11 50 ca.
12' Disc Wheel 175 semi-preum Tire hy 6.6.
13 50 ca.
14' Disc Wheel 175 semi-preum Tire hy 6.6.
15 0isc Wheel 175 semi-preum Tire hy 6.6.
15 0isc Wheel 175 semi-preum Tire hy 6.6.
16 Disc Wheel 175 semi-preum Tire hy 6.6.
17 Disc Wheel 175 semi-preum Tire hy 6.6.
18 15 ca.
18 15 ca.
19 Disc Wheel 175 semi-preum Tire hy 6.6.
19 Disc Wheel 175 semi-preum Tire hy 6.6.
19 Disc Wheel 175 semi-preum Tire hy 6.6.
10 Disc Wheel 175 semi-preum Tire hy 6.6.
11 Disc Wheel 175 semi-preum Tire hy 6.6.
12 Disc Wheel 175 semi-preum Tire hy 6.6.
13 Disc Wheel 175 semi-preum Tire hy 6.6.
14 Disc Wheel 175 semi-preum Tire hy 6.6.
15 Disc Wheel 175 semi-preum Tire hy 6.6.
16 Disc Wheel 175 semi-preum Tire hy 6.6.
17 Disc Wheel 175 semi-preum Tire hy 6.6.
18 Disc Wheel 175 semi-preum Tire hy 6.6.
19 Disc Wheel 175 semi-preum Tire hy 6.6.
10 Disc Wheel 175 semi-preum Tire hy 6.6. 12121 S. PEORIA STREET PLB CHICAGO 41, ILLINOIS

STAMP COLLECTORS GENDINE STAMPS ONLY



\$1 Valuatio foreign stamps showing Fambus Americans New Crugusy Scool voit Washingt to Lincoln & Mac-Ambier on inconstant and Moleccas instages from Behind the Iron Curtain stamps show Americans ALSO
for stamps of the stamps
for stamps
for



Classified Adv only 90c per word per insertion, payable in advance. Minimum ad 10 words. To be included in October issue, copy should be in our office by August 25. No conceile-tions accepted after August 15th. Address orders to D. K. Kelly, Classified Adv. Mgr.

AUTOMOBILES &

HI Mileage-Speed Equipment from the World's Largest Supplier Dua manifolds finned heads electric doors lowering sets fuel savers thousands of items for all cars. Hugo cataling 25c (Libstrated L tersture free) Wholesale to garages Newhouse Automotive Industries, Los Angeles 22

MODEL T Fords Sale. Details and pho-

PREE motor magazines automobile literature old new and foreign giology photos mader books shop manuals of fered with non-profit organization, Write today; get on free malling list. Auto-Mantaca, Inc. Stockbridge, Michigan.

FIBEROLAS automobile bodies, Build your own, Lowest prices, 14 years plantic experience reflected in complete information estalog—loc Oem O L to Box 6862A, North Rollywood, California

AUTO owners Law Book \$1 00. Richmond Enterprises, Box 1903, Augusta, Georgia.

CROSLEY parts, speed equipment, accessories, plastic bodies, tire recaps—by discount to cale members. What mode, Crosley do you drive? Write; Crosley Club, 2101 Greenway, Charlotte 6, N. C.

REBUIL/T Engines for midget cars \$17.00 to \$17.00. Soud \$1.00 for catalogues. Caumel Motor Industries Temperance Michigan.

AUTO SUPPLIES & EQUIPMENT

BRUSH Plating Outfits connect to a battery No table of this Fe aired Free particulars Gunmetal Co. Ave E Decatif lives 4

1954 EDITION It a New It a Different? Det world a lattest Auto Accessory in Parts Cutalog a ld save m ley 112 pages Over 50 000 sems including Harywood Accessories Hi Speed Equipment Rebunt English all parts and accessories for all cars and trucks. We have that Hard-To-Get part. Jam packed with bargaits Completely sustanted. See d. 25c (refundable). J. C. Whitney. 1919-KB Archer, Chicago. 16. 11b. ats.

"AUTOMOBILE Accessories", for Free Trial! Write-Reher Industries, LaVerne 4. California

NEW And Used Parts At Savings Complets guaranteed parts service for all models cars and trucks, late or old Largest in the West Army parts specialists No catalog write for quotations Fast Mail Order Service Pioneer Auto and Truck Parts Co. 788 W 13th Avenue. Denver Colorado

SAVE your life with amazing new 'Torplon-Flex Sway-B. izers Stops sway shid ende Postal brings free Loutrated il erature sift offer Sway-Billier 5434-B. Higgins Chicago 10

AMAZING wattage-power regulators. Stop generator regulator and battery trouble There is no better regulator for ears and trucks Guaranteed New try it on own car plan. Write Scientific Electric Co. Box 2162 BC Cleveland & Ohio.

SPEED equipment any car write Power 127 West 117th, Hawthorne, California.

PORD-T Parts—Engine and chasts. Parts for other old in dels Specias parts made to order B. S. Wisniewski, Milwaukne 7 Wisconsin.

CUSTOM Accessories Headquarters. New summer ca'assig hast out most complete ever... jam-packed with items not in stores. New Low Prices.—25c. Eastern Auto 2319-D South Grand Los Anseces 7 Caul

OVER 700 miles per eallon One-Your car rains inventor free information Cane Economy Club \$664 West Pico. Dept PS 4 Los Angeles 25. Calif

\$2.00 NOW will give you a better motor Use the patented Lachapelie's Treatment Perns Products, \$130-D Walnut Dr. Los Angeles I. Calif Proc data

PUNCTI RE-proof your tires in 3 minutes Write Spandeo, 412 D Portland, Rochester 5 New York,

AIR Condition Your Car Send \$1 06. Venic Box 5. Columbus, Indiana

SENSATIONAL Free Trial Offers? Surplus stock of lamous Gale Hall automotive instruments brand new original cartoms. Try at our risk for seven days then return merchandise or send payment. Professional Compression Testers or rinally \$ 5 5 now \$2.98 Terrific value. Combination various Gauge Puet Pump Testers originally \$4 19 now only \$3.00 Original Only Hall motor condition gassine economy gauges for permanent dashboard in uniting. Standard originally \$1.50 now only \$4.98! (Add 40c to each price for pustage.) Order Now New Excitand Surplus Sales. Dept. PS I Newburgport. Mass.

BUY Wholesale direct Nationally advertised Auto Supplies 10 000 other (tems Free Wholesale Idea National Buyers Service Box 426FD Outland California,

3% MILLION Cadiliacs. Buicks, Olds Pontiscs 1816 to 1830 use Spark-O-Liner to get new car emothers power gas mileage Only \$1.50 at a lightlion sobbers. Free factory ignition by eth shows how to install Write Hove 5606 Clinton Minneapolls 18 Minn

PROVEN Yapor Injection for greater pick up and m leage Manufacturer direct Just 23 16 postpaid. Coar Enterprises New Hampion, New York.

200 Miles per gallon carburetor Proven practical, Patented, Patent drawing \$2.00 John Andre, Rocky Mountain House, Alberta.

BUY Wholesale nationally advertised auto supplies, thousands other products at big discount. Free "Wholesale Plan." American Buyers'. 628-E. Linden, Buftaio 18 N T

RAELITE Pistons any make or model. Complete Piston Service. Upland. Calif.

END oil changing! Refine your oil as you drive Refine antiquates al, other oil fi ers Free book et on eating your car or tractor motor International Refinol Company 8847 W 47th Brookfield, Illinois, "Chicago a Technical Buburb"

NAPETY Belta, Green Blue, Maroon Green Hardware Instructions Included, 44 95. Box 1147, Poughkeepsie, New York. NEW Auto-Guard stops thief Betler than insurance Watches car day and night, Guaranteed. New, try it on own ear plan. Write Scientific Electric Co., Box 2:63-HA, Clereiand S. Chio.

ELECTROPLATE autoparts, novelties, mirrors, Easy inexpensive home processes. Pres bookers, Tyco Metals, Box 1121.-PC Houston 19 Texas.

CAR Burning oil? Losing compression? Try Clifford's Compression Seal 37 postpaid, Clifford's Engineering, 1325 Seventh. Aurora Hidrois

INCREASE? Opnoting mileage Three to Pive more miles per gation. Guaranteed Gasoline Vaporizer also Increases Power Easter starting \$3.56 Turb-O-Valle. Street Cast.

ATR condition your car for pennies, instructions 30c Ken Box 1536 Stockton. California

\$10 000 YEAR men wanted \$400 00 required to start, Hewitt s. Medicine Lodge.

AUTO burgler elerm . . . Stop thefts. Easy Do It Yourself plans \$1 00 Inexpensive parts anywhere . . Moore 19205 Almond Road, Castro Valley Call?

"AMAZINO" - New "Waz-T-Weah"
Wazes Car As You Wash, \$100 a tube.
Wil-Don Co. 896 Polk Avenue. Akron O
MOTORIST Save Geseline by Vecu-

MOTORIST Save Gasoline by Vacumeting overrich mixtures, Fits on cars. For free particulars write Vacumetic, Dept 2085, Wauwatosa, Wisconsin

AUTO TRAILERS

BUILD your own trailer! Plans for all kinds. Illustrated catalog 19c, Jim Dandy, 125-8. Wausau, Wisconsin.

ASSEMBLE Yourself Trailer Kits. Pickup Coach Kit Blueprints Literature 10c. Comstock Trailers, 585-5K Persons, Kan.

MOTORCYCLES, BICYCLES AND SUPPLIES

RECONDITIONED motorcycles and motors. Chromium accessories. Complete at ack labout parts. Expert rebuilding Fast service ladian Motorcycle Sales. Kansas City 21 Mo

SMITH motorwheel \$15 Martag twin engine \$5 Garden tractor \$10 Check motorcycle \$15 Servieve e \$35 (Mailorder only) Send 25c for Directory number \$6 just out listing these and hundreds of other bargains in new and need midget cats instoracoters engines parts plans for homeburders etc. 35c by first class mails. Midget Motors Directory Athens. Only

WHIFZER motorscooler \$20.00 iwospeed Cushman motorscooler \$20.00 Indian Scout motorcycle \$40.00 indeet car \$15.00, homemade motorscooler \$4.00 Bend 25c (35c first class that for calsing #26) jammed with sensational bargains in wheels motors motorscoolers midget cars, motorbites construction plans, etc. Oall, 13.13 Jefferson Toledo Ohio

SEND for free folder on How to Build Your Own Motor Scooler' St. Louis Products Box 24 BH Normandy 21, Mo. BUILD a Helicopter Jet Engine Yourself! "Practical Ram Jet Design" \$1 00. Deciter Engine Works Plasteren Virginia

PULSE net plans for helicopter distincter of Westerd Subsyan Obio

PROPELLERS, plans, hits for air boats, snow sleighs, Immediate delivery Catalor 25c, Banks-Maxwell, Box 3301G. Pt. Worth, Texas

BATTERIES, GENERATORS, ETC.

EDISON Nickel odorless storage butteries 12 to 600 ampere bour Ary v. Page Long guarantee Literature, Hawley Smith Co Crotob Falls 2 New York

ELECTRICAL SUPPLIES A EQUIPMENT

LAMPS-250 brings bargain catalog showing all parts for repairing build of Contains Instructions for electrics a vages oil lamps, etc. Oyro Lamps 5402B Clark Chicago 45

MAGNET wire varnish (one alle a. Ejectric Motor Service 300 De aware Mason City Iowa

MOTOR rewinding supplies, plans nestructions. Modern. Box 4704 Kansas City Missouri

WELDING, SOUDERING

Hall D. Cr Own a c. weider and a c. thread real with a good used do to a and tow coat Habart at e and Walla a y-wilcre and su, three above at a d by prover a many emergency. Write Hous weid flow P-843. Froy Ohio

A C. Welders, four sizes, lowest prions, Pres L termine Hospitson Co Califon Known

MACHINERY, TOOL SEPPLIES, ETC.

ALLEN One Ton Power Beach Type Punch Press, \$97.50. Circular Allen. Dept PSS Chrom Massers

LAWNMOWER, Grinder, New large, fast heavy daty Wines Complete shop in one unit, Circular, Precision Tool, 430 Yeliowstone, Focatedo, Idabo

SENSATIONAL New All Steel Wood Working Latne 5° Swing, 12° Centers 59 95 prepaid Circular Sypher Co 214 Cherry 10.040 Onto

\$1.00 PirE vise, send for information H A Johnson, P O. Box 42, Protivale Sta-Lant Oakland, Caltsoftia

APLENTION Jointer-Planer Owners: Patented Magnetto Caupe for accurately setting re-marpened biases now available. Write: Magne-Set Company, 532 New Haven Avanue, Woodmont, Connecticut

HEVOLUTIONARY mend tool, increases pulling power 31 'imag, free literature, Mind Die Pullet Box 271-P Uptown, Hoboken New Jersey

INDUSTRY wanted Buildings, labor bousing owner inducements Pe ry Breze-hall Pa

10 ENGINES, MOTORS, ETC.

WINDING Data, Hating 223 motors as coget and resect please \$1.00 Motor Data. Helt 7631 Equals City 28. Mo

A C Clemerators 730 watt \$38.50. Twin cylinder compression with place \$22.50 Moturs I hurse \$37.50. Sutter 1885 Mil-waukee. Chicago \$7

REBUILT 1's to 3 R.P Engines \$17.00 to \$37.00. Caudiel Motor Industries. Tem-

11 BOATS, OUTBOARD MOTORS

NEW used rebt it marine motion Maric cur elstone fittings Free Catalog, Siskes Marine Supply Dept. 23. Coldwater Mich

It is a constant per Boat Patter's Burner, so have been New 1955 to astroned Burd A Boat catalog of 50 naval area ecodesis ed. Crusers Rucabout 1857 have the translation of the second Rucabout Burner Causing \$1.00 hayer botter 1954 Haw to Halle Boats book \$2.50. Polywog Rouseboat Piura \$12 Cleveland Boat Blueprint Co. Dept. A-77 \$100 Steinway Cleveland & Objo.

OUTBOARD Motor Parts New Used for all makes Send stamp for price quotation dating parts needed Outboard Motor Mart Inc. 1290 State Street Boston. Manuscriptetts

BUILD marine engines with Federal Conversion Kits Pederal Marine Musors 9011 Cottage Grove Ave. Chicago 19 Lil

MARINE conversions for Ford and Jeep engines Catalog 10e Lehman Manufacturing Co. 972A Broad St. Newark 2 N J

BUY Wholesale pa bolding advertised of those da thousands at er products at big discount free Wholesale Plan American Buyers 628-E Linden Buffalo

FREE Cataing' Boat Eith Traders Fibergias Marite Hardware Luger Industries Dept MD 3207 Fremont South Mannespalls Mannesota

FIBEROLAS permanent boat conting Lowest poices 14 years plastic experience reflected in complete information catalog - 10c Ocm-O - Live Box 6462B North His record Cambornia

PIBEROLAS—liletime bost covertoss—building materials—compare por prices
Free information, 135 page illustrated
Auto, Bost Puraiture construction manual—60c postpoid Northwest Pibr-Olass
Company, 1531 North Morgan, Minnespods 11 Minnesota.

AIR boat plans hits supplies Catalog 25c Banks-Maxwell Box 1301J Pt. Worth Texas

13 BODY BUILDING COURSES, JII JITSU & ATRICTIC EQUIPMENT

PERPORM Thribats Strong Mac Studies Pully illustrated new handbook 50c Anaddia Bank Co. 310-ST Fifth Ave New York 10

DON'T Want To Wear O appear Exercise your even to remain race on a ght without a seen Serd \$1 50 to Parks 248 E. 2 Street New York City

BARBELLS, Dumbbells, Exercise squipment Courses, Pree bookert Good Barpell Co. Reading Penns

II FILLD GLASSES, TELESCOPES

PREE Catalogue! Thousands war surplus optical barrains Lenses. Prisma. Telescopes Banoculars, etc Send \$1.00 for 10 Lens Hobbyrst Set and Project bank et O. Jacques, 481 West Merrick Road Lynbrack New York

SAVE 25 Ort interesting facts Free 51 was Supposed Telescope Catalog 8, 96 to \$250 001 United 2013 S. Western A-9016 Catalog 20 Dealers Wahled

REFIECTOR Telescope Kita It im \$6.25. All parts designed and built at our Hoboten Inclory Mirror Cells, Diagonala, Focusing Mounta, Tripoda, Tubing Oculars, forly gustanteed Free Instruted catalog Easy time payments and lay-away place available. Send orders and inquiries to Esco Products. Dept. PS 1 1428 Willow Avenue. Hoboken. New Jersey.

WAR Surplus Bargains Millions of letters, instruments to escopes by a large componer s. World's greatest optical market place. Seld oury \$1.00 is, beginner as-less Kit & big Instruction. Book et Sock CN. With for Cataing CN. Free Edmard. Scientific Corp. Barrington. N. J.

TELESCOPES Microscopes Berneulars for quarter century Big burgain scientific catalog 10c Harry Rose (0 West Broadway New York 7 N Y

DYNASCOPE—New Sensational Refertor Telescope (5X 130X 167X 4 power Firster (u.y achromatic 5 foot Tripod complete ready for use Send for Della 8 Criterion Mig. Hartford Coots. Dept. DS1

REFLECTING Telescopes completely assembled, 60%, \$29 to Guaranteed Opportunity clearless Free it is muston Skyscope 475 Firth Avenue New York 17

BINOCULARS Telescopes Microscopes Terr de values 23 M up Request Free-Money saving entang Criterion. Hariford Conn. Dept. S24

LOWEST prices all sizes Binoculars. Telescopes Microscopes \$2.30 \$32.00 free ca alogue Joe's Microscopes Sales 4827 Second Street, Detroit 1. Michigan.

SPECIALISTS, Used, new interoscopes, Prepared sides, Supplies Free entaine, Nassau Optical, 9 W Greenwich Roosevelt, New York.

IMPORTER 5 Special Ta32 I P Binocular 328 40 5230 I P Binocular 319 80 with case each 100 300 300 power microscope 12 95 post, aid—tax included guaranteed Jo-Jo a. 1825 Atlantic Avenue Long Beach, Calli

AMAZINO prices binoculars microscopes telescopes Free trial Folder Binocular Selecting catalog free Dealers wanted Prenties Importers. Mersury Bidg. West Los Angeles 25. California.

GIANT 100% steel and brass constructed telescope complete y assembled with two exepleces believene instructions and heavy tripod—87.50. Other telescopes at \$12.00 and \$16.00 Free information, 400% telescope makers kit contains brass focusing tube erector 5 lenses, instructions—13.15. Suffolk Science, Mattituck 4, N. Y.

15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAFFING

136 PROPUSELY Illustrated pages, antique purtols, awards daggers arinor etc. 500 Ratert Abels PS\$60 Lexington Ave. New Y & 21

CAST Iron Sinker Molds—for making your own sinkers. Free illustrated booklet Reading Instrument Co., Box 78 Reading. Pennsylvania

3 000 BAROAINS firearms be culars war relies, entalog 60c. Smith Museum Runnemede, N. J.

PREE copy The Archer a Magazine Request. 1200 Wainut Street, Philadelphia 7 Let be

BAVE 30', Pinest bows, arrows complete bowhunting outfile etc. Free estaing and 'How to Beject Bow'' booklet. Write (Send 25c for 'How to Bowhant' booklet if desired) Malaby Archery Los Angeles 3. California

MIN-O-Aire keeps minnows silve. Motorized unit Pluga into car eigarette lighter & volt 59 95 File all minnow buckets. R and E Company, Box \$423, Dallas 22 Texas

MOLDS for Fuhreman's Sinkers Juga Squide Casti & and Splunting larges Free Catalogue Sweet's Molds. Tonswands 3, New York

Sty W sends nationally advertised rooting goods thankands other p oduces it has decrease Pan'. American Buyers 611 & Linden Bullain in N Y

EVERYTHING for the shooter Handto a Roles Scopes Targets Ar much for Loading Torio Sights Equipment etc Gast Catalog 25c Resuddable first order Badger Shooters Bupply Owen. Wisconstn

GOLF picture score carda cut down source permanent tournament record Send #1 00 # cards. W Thomas, 212 Victoria Costa Mess. California

DIVING Lung Compressor, Make your own, Write Stewart, 424 Greenwood Avenue. Trenton, New Jersey

JAP rides altering American shells \$6.00 catalog \$c. TP Shop, West Branch 10 Michigan.

PIO Fish smell "Quick-Catch" But from distance! You hook 'em tast' But eas p made Scientific Directions \$1 Star 405 Madison Fort Warne Indiana

SWIMMERS! Send 23 95 for Imported Prench Mask Skin Divers' Catalog 25c Aquatum Davenport & Jowa

FISHERMEN Big Fish are Smart Fish that a sky they live long chough to become Big Fish Out smart them use a Hidro-Fin The alent boat propeler Wilterfor free information. Hydro-Fin Industries 1:521 Mark Detroit 24 Mich.

CALL Elk Deer Coyote Fox etc. Original Animal Calls Burley. Idahu

6 CAMPING EQUIPMENT

AIR maltresses sleeping bags tenta (discret from manufacturer) camping equipment Low orices Bend 10c for 72 page shustrated tent camping equipment—tent has exance catalogue Mor San Sales 10-21G 50th Avenue Long Irland City 1 New York

12 DOGS, BURDS, HAMSTERS, RABBITS & PETS

MAKE Big Money! Raise Chinchilla Rabbits Cash Marketa Supplied Write Today! Rockhill Ranch Bellersville 14, Pa. RAISE moneymaking Angora New Zesland Rabbits, Particulars from White's Rabbitry Jackson, Michigan.

HAMSTERS go den young \$4.00 pair fu ly developed \$5.00 pair Adirondack Hamstery Prospect 33, New York.

GUINEA Pies. Cash markets. Booklet free Taylors. B436B Hapeville Georgia.

CHINCHILLAS (no rabbit) easily raised.
Productic Big future Terms. Cities Chinchians Ithaca Michigan

BAMBOO bird cages—Single roof \$3 05 Double roof \$5 95 Hexagoral style \$6 25 postpand Jo-Ju a 1825 Atlantic Avenue Long Beach Canf

PETVET dog and cat first-sid \$1.00 ppd Wey Brothers. Quanah Texas

ALBINO & Panda hamaters. Literature for Bin Reid Simmons Hotel, Wauchula. Florida

PORTUNES in Chinchillas. Free plan Continental, 2834 West 65th Street, Chicago 29. Illinois.

GROW Mushrooms Cellar shed and outdoors Spare full time year round We pay \$1.50 ib We paid Babbitt \$4 145.00 in lew weeks. Free Book Washington Mushroom Ind., Dept. 177 2854 Admirst Way. Seattle, Washington

18 PROG RAISING

JUMBO Prog Raising Profilable Information. Pres. Vol. Brashesrs, Berryville

FARMS, OTHER REAL ESTATE

10

FARM Ranch Opportunities Pavorable conditions, Washington Minusouts, Montain Idens O eyen North Dakota, Literature farm descriptions, Specify which state, J. W. Haw. 120 Northern Pacific Ry. St. Paul I. Minn.

EALIFORNIA Ranch Lands 50c to 25 ac in minimum bid Farm ranch huntbeh retire the brings I estrated and cure if outline the a Tax Land Same. But 2350BX Hollywood 20 Celif

BTROUT Realty Catalog Mailed Free! Farms Homes Businesses 34 States Coast to-Coast 3240 bargains described World & Largest 34 years Service Strout Realty 255-23 6th Ave. New York 10 N. Y.

MAKE Big Money in Marvelous Houston America's Fastest Growing City Buy thus ranteed Homesites in beautifu Buburb Special price 4345 Terms Fine investment Boulant free Nathan Wood, Box 413 Houston Texas

\$5.00 PER Acre. Missouri Land. Warranty Deed. Free List. John Carvert, Plant City Fiutida

NEW 13 Unit, modern motel well local ed comp flarastey Clerksville, Arkaraas

2) POULTRY & SUPPLIES

RAIBE phenants on \$100 week punt. Litt's capital and space can make you independent Free details Great Central Bys em Columbus & Karsas

12 PROFITABLE OCCUPATIONS

DETECTIVES Bern Big Money, Excellent opportunity Detective Particulars free Wilte Wagoner P-125 W 86th N Y 16

HOW to Make Money With Home Workshop describes amazing methods used by hundreds of successful traftemen Trils what to make How to sell workshop output space time Write at once for deland Craftsman 11588 Worth St. NYC.

\$5000 FROM Half Acre growing Olinseng crop bought Particulars 10c Associated Growers, Sperling, Manitoba

PREE: "301 Profitable Small Businesses Amazing chocatring plate? Wirk H me' Start Stare-time Detimant Surveys. Kenmore 23-T, New York.

ADDRESS Advertising Postcards, Must have good handwriting, Box Sine, Watertown Mass.

CONVERT spare time space into income little if any competition brief tens how \$1 postpaid Fe land Dept B Box 1950 Great Fairs Montana

OWN A Chilection Agency pave big Prank'in Credit Roanoke I Virginia

WELDING Pays \$46 Learn easily at best equipped school in country Non-profit School with low cost training O I approved Write Hobert Trade School, Box P-842, Troy, Ohio,

BUY Wholesale direct A'l nationally advertised Appliances Homewayes Watches, Cameras Sporting Goods Gutwayes Savings to 50 Catalog 25c Relundable, Wholesalers Mart Box \$125FG Houston, Texas

BCY Whosesale thousands nationally advertised products at his discount Free Whosesale Plan American Buyers 428 S Linden Buffalo New York

DOLLARS in Every Mail Professional Mail Order Technique Information free 8 Ryde 327 West 120th Street, Los Angeres 61 Calif

NOVELTY Manufacturing of Ash trays. Book ends Pigurires pays excellent profits No expensive moids needed Pisatez. Box 167 B. Fails City Nebraska

FREE Book 505 Odd Successful Hastnesses Work home! Expect Odd Pacife—J7C Occurate Cant

START "Silverware Renewal Service"
Franchise Exclusive NuStiver 508-P88PO, Autora, L. Ino.a

PANNING Gold prospecting catalog listing maps mineral broks gold pans party on lesson iree Old Prospector Box 729D2 Lod Caufornia

DRIFTWOOD Booklet—details on finding processing lamps plaques merchandiang 50c Driftwood Box 2381 Kanmore 23 New York

imPorted Oriental Tropical and European Ofth Curios Wholesale' Extremely strange beautiful items that sell on sight! Free folders Tempia 1809 Oreenwood Tropion New Jessey

"EVERYBODY Lites Candy Learn to make professionally (Our 43rd year) Ragsdale Candies East Orange, N 3

OROW Mushrooms Cellar shed and outdoors Space full time year round We pay \$3.50 lb We paid Bubbitt \$4.85 in few weeks Pree Box & Wash ston Mushroom Ind Dept. 101 2854 Admiral Way Seattle, Washington

23 BOOKS & MAGAZINES

SPARETIME Profits Taking Subscriptions. Ail Magazines. Wholesale Catalog Free, Cassell Agency, Westfield 1, N J

GOOD Used Books 50c-\$1 00 Free lists Editions. Dept. PS Hempstend New York

HE Rich Make more money Amazing success book 30c Used books 12 51 List from Persil 436 N T Ave., Brooklyn 25 New York

BOOKHUNTERS! All Bublects, Send Wantel Jaher Book Bervice, 420-K East 178 Street New York 57

NATIONAL Geographic Magazines 1686-1952 Any take Periodical Service. But 463 PS W mington Delaware

ATHEIST books, Catalogue free Truth Sector Co. 38 Park Rew New York 8

SIGHT Without Glasses—151 pages showing how you may regain your natural vision and discard your glasses forevet A so children Unbedevable \$2.00 C O D a accepted Luco Pine Boull Arkanaas

BOOK Catalogue 1000 Bargains send

PROPHETIC Books that have convected infidel could Edom Waltems Route 2 Jeffersontown Kentucky

NAME The Book We il Get fit Chicago Booksmart Pr Chicago 40

HYPSOTISM

STUDY Hyphotism Amazing Rustrated lessons Big 280 page trea se jam packed with fase nating information Simple understandable imaguage yould entry Full price only \$2.55 proposed or COD Plus Postage Satisfaction or refund quaranteed. Order "Hyphotism" today Nelson Company 210 South Clinton, Dept 28 Well Chicago

PREE Illustrated Hypnotism Seithyp nosts Catalogue, Write: Hypnotist 1334 Wilshire Hollywood 17P California

LEARN Hypnotism in one week. You can anyone can operate free: Specco Box 345 Winkes-Barre I Ponna

AUTOHYPNOSIS forto 25 Hypnotism, Lessons 25c Laoyd Contra. Appalachia.

MECHANICAL Hypnotist new invention causes trances immediately Instructions secrets included \$2.00 C is G F O. Box 1312, New York 1.

MAGIC TRICKS, PLEZLES, ETC.

500 TRICKS Douglas lamous 120-page Catalog of y 10c Fastest service to magicians for 30 years Send 10c loday Diagnam Magiciand Dept 2 Dalias Texas

PREE Magie & Novelty Cutalog incaudes 14 wonderful magic tricks fully illustrated and described Read all about our Pree Cuft Offer Chicago Magic Center. PS 6 10 W Randolph Street. Chicago 1. Illunois

VENTRILOQUISM Easy to learn in 60 to 90 days. Home Study Course' Results Outstanteed. For free information write stating your age. Dummy catalog 25c Fred Maher School of Ventrioquism. Box 36 Studio PS 6 Kensington Station Detroit 24 Michigan.

VENTRILOQUIAL Dummies Courses Berrots Minologues etc Catalogue and Equitations 31 Deductible first order) Cough 218 N Jefferson Hartford City Indiana

PUZZLE lang. Send \$1.50 for your flurprise Puzzle. W Pillippone 19 Hamilton Avenue Babylon, New York

FREE Catalog Best Magic, Practical Jokes. Top Hat Magic, Evansion 12, 111

BE a Magician Large professional magic calaing of latest tricks 35c. Ireland, F-109 North Dearborn Chicago

AMAZINO Novel Trick butterfly flutters around laps, flower then variables appears sensations, \$1.00 complete M ugus Magic Shop, 346 Pann Ave., West Reading Penns

2500 TRICK Catalogus (512-pages)
pocaet par or stage World's Pinest
Magic Catalogue \$2.00 (do as trick incl ded free) Kanter s. 8-1311 Walnut,
Physidelphia 7

HAVE Fun Learn Fortune Telting Send \$1.00 20206 Rart, Canoga Park, Cal.

26 COINS & CURRENCY

OFT Profit and Pleasure in collecting old coins Send to for 56-page Hustrated or n catalog You if he de igited with it Send for it now H Man Mehl 374 Mehl Banding Port Worth Texas Largest rare on a stablishment in U S Established 54 years

FRFE Purelen coin banknote and Coin Coi ectors Liustrated Catalog to approval service applicants Bend 3c postage Tatham Coin Co. Springseid-50 Mass

UNITED States Rare Com Value Guide. 68 pages 50c Firtunes in rare come ideal, 4644 S Geary San Francisco IS Call!

Oi D Money Wanted. Do you know that Cain Consectors pay up to \$100.00 for certs o U S Cents And high premiums for all zore coins? We buy all kinds Send 40 for Large Coin Folder May mean much profit to you Numismatio Co Dept. 30. Fort Worth Texas

JAPANESE Invasion nutes for U S. ic to \$1 000 00 set \$1 00 100pp. Catalogue. 256 Shulla Balt Lake 10 Utah

FOREION Come twenty different each from a different country \$1.00 postpaid Webb 730 Gough San Francisco 2 Calif.

WORLD 8 Orestest Magazine for coin co. ectors and wooden nickel 10c. Lawrence Brothers. Anamosa lows

COIN Magazine 100 pages Sample 20c Numisma ic 7320 Mi waskee Chicago II

BIX d Gerent US Indian Head Cents for 25c Eacht d Gerent I berty Head Nickels for 8, 00 five d Gerent Canadian Large Cents for 50c Price hats of US and foreign to Fe Iree No approvals sent Bryson Stamp Company 612 W. to To ado Onto.

28 STAMP COLLECTING

200 DIFFERENT including Roosevelt triangle 10c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

FREE Complete set of Famous Americans Flags Parks and Presidentials to approval buyers dend to for 15 of the above stamps plus full particulars. Tributo Stamp Company 145 Massau Street, Dept 208 New York 18 N Y

POLAR Bear Triangle Grant George Wash ogton Six Coursed Ecuador Arctic Triangle first American commemorative Corsica Devils Island others Everything Iree with approvals. Capital Slamps, Little Rock 10 Ark

43 ALL Different U.S. Stamps Includes t 50 yr ada commemoratives airmain and 55 00 Stamp O y 10c. Approvals, Willest Co. Box 511-M Port Ches er New York

AMAZING Offer 200 United States stamps including commentatives autimate high desominations to \$,00 or ly too to A. proval Applicantal! Hinstrated Bargain Lists free, Mystic Stamp Co. Dept. 55. Camden. New York

FREE Stamp Collection -100 different stamps from Europe. Africa. Asis. Scandinavia. Balkans. etc. 3c to approval applicants. Tathum Stamp Co., Springfield 50. Majaachusetin

J27 DIFFERENT Stamps 25c! Including early Canada New a diand. British Co. mies Vatican Red Russia, Ritter Brads Is dis a states Artificials. Airmails French Co. mes Rar les Gustaits Every & am. d. fe con Rare ha sur a with apprivate Manney back gustantee Ningara Bramp Co Ningara o el e Lake 42.

FREE -Big United States Catalog Val-nable guide and check list. Hundreds of illustrations. Approvals. Hattisco, 468-O Transit Bidg. Beston 17 Mass

225 STAMPS For Only 10c' This mammoth value includes Airmalis Pictorials stamps from strange Countries estaloguing Stamp Campa y Caste Sa New York

WOW! 153 All Different Germany 10c Zeppelma Bent Patau Atronam High Values, Lig Barga o lists and ap-provals included Jamestown Stamp. Jamestown 506 New York

PREE Valuable Illustrated Catalog. Over 1170 special offers, attractive Bay-gains' Approvals Kanmore Millord9C N H

NUDER B., et ortus approvats toe! Atlas 4840 P Esset-hower, Racine Wise

COLUSEAL Stamp Zon 10c Jungse Bear h Wi diffe Di men it un main Piltren differe t lacindang Rhamotti i Kle-phant Shake Ther Zahu, Kangaroo Kaabear Fmu, Kookabura Bull Horse F., danka acceptangan Bend 10c For Postage And Harding began Stamp Company Ninears-on-thelase al Canada.

329 DIFFFRENT Weridwide Stump 35c. Inc uding H ther Brade Brich Coloring.
French Coloring to the country EveryDid g complete 25c to ado to request of
approvate Canada Stamp Co. 1907 Main
Bt. Dept. 118 Niagara Falls New York

PREE 114 Poreign Stamps including At-1926. Australia, Pakistan Chi a India Russia and Beandinavia. Send 10c for postage and hardina With approvals Niegara Hamp Co. Niegara-on-the-Lake #3 Canada

30 DIFFERENT U.B. Sc with barga to approvals, lista, Bookman, Matia ee 2 Fra.

PIRET U N Bet Among World : Pret-tiest Only 10c Approvage Wesser But 1148 V New York Cap 8

ANIMALS. Bittle Triangles Plemers interthes Fish Borps Locomo ves. Buiterthes Kars Delators Mud.comped Hist ricas. Geographica, Musical Sames Grants
Midgets and over 106 others only 25c
with Aportorals Adults please Canada
Stomp Co. 1997 Main St. Dept. 253
Niagara Palls. New York

100 DIFF Latin-America 25c Excep-Free, Econopackets, Box 188-PS. Riverside

MINT signal sets on approval A H 1207 North and Avenue Buffulo 25 W Y

PABULOU . Conjection Romeve t and Dictator Stamps Mammoth Inscinating collection of Romevell at a Dictators Incouding Stalin Title Franco Lenin Hitler and great many others pour free bookset and burgars ore A. for de with approvais Jamestown Stamp Dept. 410 Jamestown New York

60 000 STAMPS Sale Grabbag 40c Big lot better stamps 51 Evira special 52 Gunt assortment 55 Persil 436 M Y. WE buy mint US, Collections, Write,

New-Way Stamp Lawrence, Mass.

FREE sample stamp newspaper, valuable information on collecting special lists. Approvals. Littleton Stamp Co., Littleton A2 New Hampshire

THOUSANDS of Stamps can be added to your co retion at I and 2e each Ark to see our big approval books of a tractive her priced a provals. Everything cals logued according to Scott's Large dis-rou is Modern Stamp Co. Dept. B-7 Perriaburg Michigan

PRAE Valuatio British Empire Co lection 105 a.l diff from Aden to Zanriber' includes Carman Picairn and many other exotic rol les High calains value' Bent for 10c ma ling expenses. Approvala Kenmore, Milford 9-T N H

FREE Scott s International Album Other premains Particulars with appearals Rayman 35 X Maider Later N Y 10

MIDOFT Triangle Olahi Diamond. Rhano O espland 20 others 3c Approvala Vidal 3396 Alta Vista Cincinna i 1) O

WANT more for your dollar? Try our low priced next attractive approvals Books of 500 and 1 000 L B or foreign We and have a premium card which will earn you free albums. Write today Roseland Stamp Co. Dept. B 35 Spring Lake Mich.

125 DIFFERENT U.S. \$1.05 Approves
Utechts 1141A North Keeler Chicago 51

COLONIAL Codects o Free Marricaro-gious or lection British Prench American and other Counties Fix sets A hiera Commemoratives Triangles Pic origin Commemoratives Triangles Par origin Righ Values all free plus Phila note Magazine Send Se for postage Empire Stamp Company Dept PR Toronto. Car ada

MANT Five Pound British Colony stamp quaranteed se usee face talue 635 Just 25c le le oduce our famous approvais V king 11 P Northern Blvd Great Neck. New York

DEALERS Wholesale entalog Portage 3c. Frankico. 5011 Qurensbury Bultimore Mary and

OORGFOUR Oichid Diamobé pius Enntmous 5 ce red Plag With Rogers strms !! Pirst American commentative Mideet Curties and 25 others as Sc to apply all buvers Belmont Stampon Washington

CHRISTOPHER Columbus mint bihanoring he discovered of America. This plus another madgator set of most modecolor stamps from St. Thomas and Printipe for or v 10c to approved approach to U S of I reich Clark Simp to Dept. B-45 Munkeron Heights Michigan

PREE! Price list of 250 different Cutlector's Supplies. Albums. Approvals. Little-

GIANT and midges triangles set they sold er ses it stamps. Green and countril Sowers Cogst beauty Laures astronous New York July etc 3c Approvals Ses-brook Sept 15. Washington 10 D C

SPATE 100 d Gerei t 10c to approved appliennia. Morel), 203 Fenimore Street, Brooklyn 25 New York.

WORLDWIDE SO all different absolutely free lust to introduce our incomparable approvals Kent Stamp Company GPO Box 81 Brooken New York

TRIANGLER' Airmous' Commemoratives 10c Approxais Aligator Box \$4 PSA Manni I Fiorida

STALIN Reserved giants 1501 25 oth-PFI WACU TELES

PIVE Congo Pictorials entaloging 46c. Only 10c with approvals. W Torgesen, Cornelia Ocurgas.

PREE with approved larger British. Prench Commiss La in American U.S. packet Philo 1661 Drezel Miami Beach. For rother

ROOSEVELT Greece Pupe Triangle. Oreen and Jarsel 51 others be Appl wats. Lonehorn But 1868 P Lubbeck

RENSATIONAL Riustrated United States, Posted Nations Confederate States ratelogue free Stone 45-8 Bromheld Boston Mass

PHUTOSTAT your stamp enfection. Without a camera Very perpensive no experience necessary Com, ele detail a 50c J.m Mundy Box 341 Smyrna Del.

FRENCH Africa West Ind.es Over 100 others on y loc Approvais included Core 41-O Rinewalt Buffato 21, New York

SURPRISE gift. Ask for approvals, Hearn 22 Mohawk Trail Greenfield Mass

DIFFERENT: 1 000-61 00 2 000- 62 50 2 000-45 00: 5 000-\$15 00 List approvals on request St Amant Box 124 Conzales

TWO \$5 00 US slemps plus 20 different 10e with US approvals, Irwin Stamp Co-Box 1100 Brooklyn 30 New York.

LEOPARD antelope eland, plus worldwide packet free to approval buyers. Con-quistador 2627A Troy Road Schenectady New York

EXOTIC Oriental Collection: 105 all dif-ferent stamps from Borneo, Hong Kong Ma aya Surawak Korea Japan and many other strange countries of the Par East page free booklet and bargain late Adfor only 10° to new approva, contomera Jamestown Stamp Co Dept 3.9 James town New York

CIENERAL world wide fold school way have stamps or get them) dealing of stamps, For actisfaction write Sophus Jenmen, Coupevide Washington

100 JAPAN IDC All different with approxima (fould a But \$3) San Francisco Car orn 4

ECONOMICAL '9-1-2e Approvala 22 000 varieties available Drese) Box 270-7 New York 25 New York

OLD scarce U S. seconds on approval Slightly defective bargion prices Bearn-feld (or or station Newark S N J

50 DIFFERENT Butgaria 10c' Approv-ala Ensigh Stamp Company Dept S Ber-dan Avonce Paterson I New Jersey

FREE Sample Interesting Informative Ibastia ed National Stamp News, Auder-

WONDERPUL Offer Seven companie mint sets only 10c with approvals Reich (576) (013 Lawrence Chicago 40

PENNY Asprovals by country M H Hoerto e 102 Farmington Ark

WORLD | 1000 different \$1.50 | 2000-94 90. Wexler, 3792 Farragut, Brooklyn 34

COLLECTIONS all different stamps only be each 25 Japan 25 Agair a 25 Der-mark 25 Netherlands Or al. 4 packets of y 10c' Approvata Godath Co Bethje-bert XI N H

OFORGE often George Vt Kenya set to to one Bri hig used cataloguing 50e for 10c. Approval pre-renew appreciated George Habie 1539 San h. Annieda Calif

WEIRD (sectnating Congo Idois (10) poly 250 to applicants for better grade P recan Apricants Puth 1338 ; West-minster A ambits California

UNITED Big es 40 different 10c 40 different Commemora ivea Lie No approv-

20 PHILIPPINES 10c Pictoria, approv-nia M data 221 Conego Rock Had 21 Bouth Carutha

100 DIFFERENT Spain 25c, Penny approvals included. Reed Box 980 Chicago

1000 DIFFERENT 50c approvals Quellette Box 11418 Fall River Mass

UNITED Nations cover free to applieants of U R or British Countil approv-

FREP US Hightrated bargain catalogue Re liberg of Bramfie d Bowlon t-P Mass.

EARLY U.S. 576 tanged 1817 plus 20 other nineteenth century 25c to approval B ding St Louis | Mason ri

Blafit your own stamp business. Send 100 for wholesale estatog, Shepard, Box 1147 Chicago

LOOKING for better D 8 Approvals "?? Try New Way Blamp Lawrence Mass

1000 DIFF 81 00 with approvata Jacob-sen 4395 Broadway New York 46 N Y

FIJI Bientured Health Set Sc Approv-als Piessure Stamps 1865A -5Jud Brooklyn 4 New York

250 STAMP hinges and 20 different Austra.ia free with approvant Jaydee 218 West Dickinson, Grand Rapids 7 Mich.

100 DIFFERENT US Commemoratives for 1. 00 .50 Different US Commemoratives of 12 00 200 D Terent US Commemoratives for \$4.00 Price atts of USA and foreign stamps and ou of free No aprituras sent with above Bryson Stamp Co.

SOUVENIR short 10c with approvale. Ten different \$1 00: Variety Stamp Bervice, 57-8 Circuit Avenue, Newton High-ands 41. Mass

CIPEX souventr sheet plus 35 different U.S. 16c. Approvals accompany. Village Stamps, 30-328 214 Street. Queens Village 26. New York.

438 CATALOG value stamp huge Afritan pickers set digantic Chinese stamp free membership in in ermanatial Collectors Cub 16c with approva a Profitset 20022 Juney Phoenia Armona

LOOK! Ten different foreign sein, 10c Approvals. Farmer 4613 Rosswood. Los

INTERESTING Packet Free. Approvals. Pariety Stamps. 281 Cedar, Mingapora Tempeseds.

AMAZING introductory offer-113 different including mint Peace Dove set tricolor set. Air Mail set Sport and Flower triangles, and beautiful Queen Astrid Mamorial 10c with approvals. Boulder Stamps Box 513-S La Mess, California

M ANTIQUES, RELICS & INDIAN GOODS

4 FINE Indian Arrowheeds \$1.00 noticed fint tomahawk \$1.00. List free. Lear's. Clebwood Arkanese

ANTIQUE firearms awards edged weapone thus rated bookert for Westbrook 718 Royal Street, New Orleans, Louislana

30 MINERALS & PRECIOUS STONES

TWELVE beautiful genuins specimens from Gemland Brazil two dollars. Perfectly out ton earnt Brazil—Topas, three dollars. Armail bills or check, no money-order please. Joan Book, Frain learnt 411 Miterol Brazil

OENUINE California Gold Huggeta embedded in jewelry. Write: Shipler of Eina. Eina California.

ORMSTONES Mineral specimena Origin Counters uranium samples Every variety. Lowest prices. Free booklet. Plummer's, 4720 Point Lome Avenue San Diego? Ca. J.

GRMCUTTING. Silvereraft authority. Linetrated magazine islis how Cut rocks, make jewery, 156 ads litustrating equipment, offering gens for collectors, cutters. Postal brings literature. Lapidary Journal, Disner D. Paim Desert Carl

LODESTONE Magnetic Ove \$1.00 Finished Magnetic Paper Weight \$2.00 Otmstead Company 118 East Markham, Little Rock, Arkanasa

#APPHIRE--tourns, inc -topus -garnet peridot. S uncut gem specimens 81 00 O Briens 1116B Wilcox, Mollywood 38, Cal

SEAUTIFUL synthetic ruby supphires \$5 00 carst. Daves, 4305 Glenhaven, Dallas, Truss

31 HORBIES, COLLECTIONS

INVENTING can be an interesting and profitable hobby Write for complete particulars. Institute of American Inventors. Dept. 30-E. 631-E St., M. W., Washington 6 D C

UNUSED matchbook covers 100 d flermt \$1.00 M page cain of the enatchouses about \$1.00 Creates Edelman 1313P Enat \$4 Creverand 3 Oblin.

POST Card Collectors 16 Pirst Issue Views of Cleveland Supply lie ted 50c prepaid return Cumou Cards 8:02 Codar Cleveland Obje

MILITARY Miniatures U.S. Marines American Revolution Civil War Chater a Cavairy Laurirated Cataing 23c Sumier Miniatures. Dept. 2, 60 Regard Park, Quincy 60, Mass.

23 PHOTO FINISHING, PHOTOCOPIES, ETC

TWO Prints each good negative 8 exposures. 350; 12 exposures. 56c; reprints. 4c. Mayfair Photo Service, Sox \$17-A, Toledo I Ottio.

DISCUSTED with poor photo finishing? Something new Sand film or inquire Your credit is good. Statement with finishing Jerry's. Dept. D. Box 1331. Leasing.

PHOTOGRAPHY For Pleasure or profit Learn at home. Practical basic training Long established school. Pres booket American School of Photography \$35 Diversey Porkway, Dept. 174C. Chicago 14. A JUMBO Prints in Album 20c, 12 exp. 20 exp. 85c 26 exp. 81 25 Pres Matter M-In Photo Box 166D Brooklyp in New York

ROLLS reprints humbes in albums 6— 30c, 12—40c 16—50c Bohs Photo Box 21. Pairment West Virginia

SENSATIONAL'S Jumbos—25c 13-35c 15cm M exposure — \$1 00. Guaranteed Quality With this set only Frash-Peter Box 36A Brooklyn 4 New York

PHOTO Print Bargain Only \$1.00 for eversive prints of any 5 or 12 exposure 5 m. Plus new treshy dated Kidas fum 26 hour service Dant take characters of prints Let Whitehall skilled finishers with years of expense re most modern equipment highest quality materials photoment highest quality materials photoment highest quality materials photoment highest quality materials photoment has real firm for very best for a firm from the Novellies and Portland of Christman Photo Oreets as Whitehall Studies. Inc. Dept. 18 Elmira, M.Y.

NOW-6 Exposure rolls Jumbo Size 25c. 12 exposure rolls distributed on Jumbos size and 3 exposures partied regular size 1 such 30c. 3 such 40c. Add 10c for 12 and 14 exposures. 30 bi Holds on double-weight paper. It well plant or hearing \$1.00. If each specify offer wanted L.A. Eactman Studio Bode Ioms.

Elica-Size Prints from your roll film. Jest than to each out you return this addered prices quality fast service from photo charges of the world. Over 300 cub as is not customers if expensive rol. 25c 112 for 116 the 128 to Money back guarantee thend for Ires mailing bag and complete price list. Rochester I m Y

REALTIPUL Results at low costs Jumbu Overnor Salabing Quality workmanship 8 exp. rul superfire fits showly 40c 17 exp. she 14-exp. 70c 36 exp. 61 to Overlor reprints be each Send us year under Free Matjura Mailing Pilm Service Box 54-0A. Chicago 80. Illinois.

JUMBO prints 0-exposures roll 20c 12gr, not so for 16 exposures. Sie. Reprints overtire to finaranteed quality Mail Order Photo Service. Box 201, Watertown, Wiscona, n

436 OR 3\axi\(\frac{1}{2}\) eversize glomy valor prints 8 exposures 40c 12 exposure 50c. is exposure 50c. Hagiser Photo Service. 1314 West Columbia Avenue, Philisdelphia 22 Pa

SENSATIONALLY New-16 oversize contect prints or I plantic bound superpair album jumbo prints with your first roof 2xx A both Studies Weather and Okla

FithE Malore & contacts 30c jumbos 40c 23 4ac Jumbos 5ac reprints &c
Jumbos & Westers Photo PM64, Max 306
Bass Pratectors & Galts

Fillido-Finest Quality-Pastest Service 8 exposures 10c 12 exposures 75c 14 exposures 81 00 enuargy to super and the about Camera Box 200-x West Chester Ferris

PRIEE 4x10 on argement with such two 130 or 630 role developed and prairied 5 Jumbin 30c 12 Jumbin 40c R Basis. But 466 Westbury L I New York

TWENTY Wa let Bise Prints any plicis

22 MOTION FICTURES, SLIDES, BOUND EQUIPMENT

CUARANTERO Fresh Jesus roll magaping to man roll magazine movie from that here free cut- at Kao-M. 47th Hour Kanasa City 2, Milasour:

FREE Clant catalog of Smitt & 16mm films for home movie enthusiasts Films for every occasion. Les Stann, Dept. PSS 11 Willard Ave., Mt. Vernon New York

MOVIE Camera Film 8 mm rell \$1.50. 16mm 100' \$3.00. Pres processing, Better Films. 742 New Lots. Brooklyn, N. Y

TAPE Recorders, Tapes, Accessories, Unusual Values, Dressner Box 66 Peter Stuyresant Station, New York 5.

Parks Movies in Rodachrone list the lites Service Supply Suite 306 30 West Jackson Blvd Chicago 6 Hitistle

5 000 4-16MM Silent-Sound Fi.ms. International, 2130 Strauss. Brooklyn 13

PREZ Barkhank s sommer sale catakes new and used [6mm; 2mm f. nm used 15mm sourd projectors new Tal' court some Bookhawk Films 1100 Eastin, Date: port less

TAPE Recorders, Tape, Sound, Hiffdelity Equipment, Radios, Wholesale, Bellejoint Electronics, Box 161, Ashland, Ky

34 CAMERAS, PROTO SUPPLIES

VITO III 12 ctd Brand New 2114 36 Contenns 13 8 CZT factory based 6,17 H Free catalogue 1001 bargains Dealer 3 Mart 34 Beverly 84 Hen Rochelle N Y

PHOTOCIEAPHY For Pleasure or profit Lewis at hime Practical basic training Long established school Pres book et American School of Photography \$35 Diternel Fareway, Dept. 1722 Chicago 16

BASS Buys Quality Camerar Since 1810 White in Chicago visit the Cun era C can Monda if the Wird of or write us for your average eq., ment cent or aved. Satis action Guara reed Bass Camera Cr. De, t. AG. 179 W. Madison Street, Chicago. . 1 tools

DISCOUNTS to 46's—cameras projectors tape recorders letters Write I is individual users one cata as C assided Camera E 223 E 94th Street Brooktyn New V k

20 TO 46% discount everything photographic Dart in 2F Atlantic Avenue Brooklyn 24 New York

OLL Coloring Physiquaphs: A faccinating biobby of bentuate sideling for Louise with artistic tase to Leath at home Easy aimpoined method free biok et National Photo Coloring School, 435 Ulversey Parketter Dept. 1728. Chicago, 16

FREE Bargain Soul packed a th hundress of fine photographic values. Write Central Camera Co. (Photographic Headquarters Bince 1898) Dept 11H. 200 S. Walsain Ave., Chicago 4 Illinois.

ROLLETOORD III is a cid case Brand New original wrappings 100 to Free catalogue, 1001 hargains, Dealer's Mart 56 Beveriy Rd. New Rochelle New York

SETTER Pictures are easy using our low cost exposure meter Send 64 PS Richmoné Enterprises. But 1803 Augusta. Ga

BUT wholesale nationally advertised catalras, photo supplies, thousands other products at big discount. Free 'Wholesale Plan." American Buyer's \$10-50, Linden.

CAMERA bargain—twin tens reflex with side mounted flash attachment and currying strap takes co. if or back and up to necture inside or our Only \$6.45 postpaid Miney back stars see Le Roils 215 Broadway Rock Strings Wyn WHOSEMALE Photographic Samulton

WHOSEMALE Photographic Supplies Cameras Pi till Pr Sectors Et a gera Wille for P en Catalog Cap to Planta Bus vites 2628 Guadaupe Aust : Texas

MUNIC, SONG WRITEAM A RECORDS

WANTED! Poems for musical aptitings Write Bongwillers Service, Ciliton W 3

PORMS Wanted for musical setting flots promit Free Chambingtion Five Star Music Massers 646 Season Edg. Buston Massers usetts

SON PORMS Wanted Mail to Tin Pan Aver fire 1830 Broadway New York 18 N Y

and as go D I mail asywhere Welle to an entired a S g Bervier 333 W M h Doct P S New York it if X

FREE Record of your song-Your Words.
My met dy Prod to formation. Jub 19
Mark a Mejody Mart 100s West 20th
River Dear K Los August 37

Priffing Wanted to be set to music Pree examinations. Send poems. McNell Master of Music, \$10-Ph. S. Alexandria, Los Angeles. California.

AMATEUR Songwriters! Top - Noteh Broadway Staff Offers expert professional opinion—suggestions for improving your song or lyric. Enclose \$1.00 with each manuscript or recording Amateur Songwriters Workshop P.O. Box 259B. Times Square Station. New York 36 New York

PORMS Wanted for Free Publication Write for Free facts. Dept. B. Poetry Publishers. 646 Pearl Etreat. New York 20

SONGWRITERS: Send poems, songs. Music Service, 343 West Tind St. PS. New York 22

POPULAR Songs, How to write and sell them. Write for free booklet Successful Songariting Gateway hough Box 2418 Ho. 740-sd 28 California

WANT Bonger ing Success. Your lyries, songs, examined for publishing recording possibility "Success-Aid sent Free, Meteor 201 Allston, Buston 46 Mass. 1954 ACCORDIONS — Whoseenle, Presentalog American Accordion Center PS 4 5329 Belmont, Chicago,

36 RADIO, TELEVISION, SUPPLIES & EQUIPMENT

NEW TV Catalog Pres Landed with bargains for TV servicemen seeb letails insta era P nest new IV anterious Meta ons (Precises on Multi Channel Table UHP Artennas Converters M tira Boosters Par a fringements burdreds of quality accessories at money saving prices Oct your earing pow National Electronics and Detec Bidg C executed 3 O

BUILD to Radios At Home on y \$18 % complete Learn Radio Construction Theory Triaghts Shorting Code PCC Residentians Complete Radio Course increase and parts componer a first or ion Books are Pres Radio Tentre and Radio Light you keep everything No maps to see you tree to descend the No maps to see from the Monte and TV Guide those request, free of charge no obtigation. Progressive 'Edu-Kita' Inc. 407 Union Ave Dopt PS-36 Brooklyn 11. New York

MAKE Simole Tubrices Batterriem Distance Geting radio Genouse Melimite crystic Desector I, as raised perfections but postpaid Asien 42: P65 Clinical Ma

GUARANTEED Television Radio tabes Lawest prices ever 6ALS of 96 hoc 12AL7 6ALS GHLS GRN OF hoc Pres price 21st contains become offer Voltage busters picture bebs rejuvenstors, antenna kills is wiptiess Crimb Television Bus 194 Hicksynia New York

PREE list Bo lder a pictorial construction juant Aseria 305 East Broadway New York 2

Chlick Counter and Metal Detector Rits Desperate Educations, Free Laterature Electron Applications Dept. & Box 4978. Washington 8 D. C.

CHYSTAL Radio experimenters Write Louis Hules R 6 Lakewood New Je sey REPAIR your own T V Prepared exclusively for your model Plus introductory bonus. Send make & model, \$1.50, T V Consultants, Box 66 Little Neck, M. Y

POCKET Size Translator Rad a Frem plete with self contained mester phone \$14.06 perioaid Electronic Nos 13 Law-rence Mass

PUT operator iscense quickly Dept & 4044 Hellywood Savd., Hellywood 38, Call-

EXTRA loud crystal art. Res is accofative stations. Plans like Universal size trust on devices t. build L.M. 25c. M. sacuri Electronics. 729 Lessington. Websiter Orders 18 Missauri

REPAIR your own TV Instructions compiled exclusively for your set. Simple as replacing light bulb. Send set name phassis, model number \$1.05. LS Engineering Box 4113-A, North Hollywood Cultiornia.

col.OH Television Enjoy low cost 3 color Television screen now Ensily attached. Free descriptive circular Zingo Products. Johnstown 30. New York

REPA'R PRIF OWN TVI Instructions 82 00 Ray Television Service, P. Q. Box 802 Radford Virginia

MAKE your non Wrist Watch crysta.
radio limitactions \$1.00 Ason Route 3
Nortock Vig. as

21 BUSINESS OFFORTUNITIES

COMM Paying Business A herting in recess plating autopur a seffect to binvites business in the most matter than the large and saids for a shed rece Booklet Gammetal Co., Ave. E. (1974).

OPERATE profitable meil order business. Write Wester Service. 4160-B. East 117th Cleveland 5 Onto.

LIVING minimizes t M g a trees of a 10 to 30 theres that Grow at Birtle B g Proff a hope either eposition by Fave that the Amazid Worle for Free need and Plat Natural Nursery Dept Cts Ingle Book & Laurence

REPAIR Done make subbet stamps Catholic 60 Ideas" Free Universed Box 10"4 B Peurse I nois

ENVELOPES addressed accurately reaentably. Fast Service We have capable addressers in your city Gleaway System \$713-X Rucid Cleveland 3 Ohio NEWEST Spare. Pull-Time Business. 35 to \$15 hour possible. Paint with Sueda—the finish with touch and eye-appeal. Beautify auto dashboards, signs, radios, taxs figurines lampe—1001 others, Complete, Steu-By-Step Instructions sent for no-risk examination. Free details. Coast 1004 MH So Los Angeles 34 Las Angeles 15

IMPORT-Export! Opportunity, profitable, world-wide, mail-order business from home without expital; or travel abroad Established World Trader ships instructions for no-risk examination Expenses at the personnel of the Angeles 24

MAKE Money spare or full time casting Metal Toys and Moraitian. Big wholesale and chain store demand for Autos. Solders Aspirary Da ha etc. Revia Ganta for Autos. Solders Aspirary Da ha etc. Revia Ganta for a sied for up to 180 and more castings, see hour. No experience or specie place accessary. Write for a symmitten and O is a most of patterns needed. Metal Cast P of ris Co. Dept. E. 1896 Boston Road New York 80 N. T.

VENDING Machines—No selling, Operate a route of com machines and earn ama ne profits. 32-page Catalog Proc! Paraway Machine Corporation Dept. 31 45 ht air 80 Ba Omore 2 Maryland

REPART old believes trie new Latest active mentals. Mailety Laboratories. Min-

BREFI) Rare Tropical Fish at home Karn Big Money' Learn Seriete Help 61 huge demand. Amazi a Oppostudical Fish Plate I (1928) 1858 Cl. Lan Ampales Bit Lan Angelon Bit Lan Bit

PIX typenesters Pres bookert describes our modern troups also home hudy course Factory me ands tought. Write faponities founding 6 Tares turn Person.

523 Walliff we king two hours delty at none Lycke has 3671 B Giretand 2 Ohio

BRON7ED body shoe metallizing equipment. Hew and used. Big selection of metal and onyx mountings. Pres cataones He record Bronze Supply 1824-A E First birect Isa Angeles 13 Onlifornia

We have our major to He heres ove \$1,000,00 m r hy an or here to be My rege r ress of hebrid decode a prientific home manufeler nethod. We bought a fetal rasich are as we a wass we red wo we see the Major Mathide Originals and risk a qualit frequency of the Major de Major Method Originals and risk a qualit frequency of the Major de Major de Major frequency of the Major de Major

INCOMP 1 to moral oil thation He is a Walle News to Laborte & Calif. Would Make by Money at home for life for us It s for Earn \$16 day easy No selling to superiones to Machine necessary. We superione to machine necessary. We superioned the plant of the parties of the first Pashion Ties. 2001-X Manchester inclewood 4. California.

PREE 20) Profitable Small Bust cases Afra 12g to entring an a Work H me Nar H a et me De trant Bust vess Kenmore 28 T New York

MAKE Money At Rome as renewal headquarters for all magazines. Liberal commissions. Ha experience—No capital needed * pplies furnished. Write for F ex Culance McGreen Maya the Agency Dept 5.88 Mayar Maya the Agency Dept 5.88

LFART Bewing Machine Repair # octrify trade set How to make Big Money at home sparetime New Julyay machines parts the wholessee Proc details. Tayan Bervice Hami ton 28-8 Ohio

ADDRESS Advertising Postcards Must. have seed handwriting Box No.e. Water-town Mass.

NOTARY Public appointments. Our 25th year Inquire Stationers Helotes Texas.

MEN Wasted Band Lagrage And Cases. At It we the self your products supply compute instructions thater as there in rg. No special equipment needed From details Caserrait 805-HS Bunset Los Angeles 12 Cast

TO \$40.00 weekly Sparetime home operated matiorder business. Successful "Bemunera plan Svery hing supplied Lyan 194.0 (No oral Los Augres 44 Calif

MINK Raising information free, Complete Lake Superior Mink Farm, Superior E E5 Wisconsin.

HOW and where to obtain Capital? Frue details, Star Service, Wapakeneta, Obio.

MATLORDER Operate profitable home business using Free Advertising Method. Revealing information free Beidal, 1976-EG Mollywood, Los Angeles 20.

WOMEN Wanted to sew ready-cut neckwear Material furnished! No selling Help fill huge demand. Details free. Neckwear Supply Box 1455-C. Las Vegas, Nevada.

POPCORN and Policy Chair progent

RECOME A Game Warden or join Formiry Park Lankout Wad He Conservelum arrives King ou date work good pay real security Complete information Free West & Home-Study Institute." 3154AT West Eighth Los Angeles 5 Calif

OUATEMALAN Typical handmade products Leather hags belts skirts, etc Masl orders filled. Dealers inquiries invited. Pres catalog. Mapilon. Box 360 Guatemaia C. A

METALIZE Baby Shoes, jewelry gifts. Bronze, gold, saiver Pres balletin. Kiktavi. 7217-ST South Broadway Los Angeles S

Pres Large Calang of Kalliant's advertised arbitances to the Wallian Jene ry Cameras, Typewriters: Tools, Kitchen ware, etc. Blast your own fully self-operating mail order business without expiral Wholesale starting kits furnished to experence necessary. Out he of urique as smalle saies plan included Consolidated Distributors. Division 102 Nor 1527 Paterson 15, New Jersey

\$1 000 MONTHLY possible from your own easily issued office business. Write Cole Associates. Syracuse 2 N Y

PRINT for Profit at home Amering now morbid practs as orfol posters banters g estang cards glassware arything Hundreds at time how, we needed he art Fartastic ports. Need representative your area drived a confront business push more man fruit Los Angeles 18 Ca at this

Equipment Zapart 566 Ph Manhattan Room 16 22 New York

THRILLING Profitable Home Business Make fast-seller chemile monkey trees dolls. flowers, Terrific holiday demand information free, Velva, Bohemja 17 N T

BCY visuomaie direct 10 000 mathemaly advectiond Apr. inners Specting Grads Warches Puzz are Auto Parts Toys Continued Main at termendous savings to project data ungentrations America Profess Pion Whitehale Idea National Supress dervice Bux 4269 % Outland Canal

EARN \$100 month easy breeding h brid earthworms, Big domaid No expenses rive information furthworm flatdens, M Peacock B de El Monte Castl

546 TO 660 from one hundle cedar shingles. Plant & Setails for \$100 M. See her \$07 Bell Street Indianapolis 2 Indiana

OWN your own profitable wholesale merchandleing besides it is ment experience unnecessary best 5 DOS famous tationally adversed products a crybidy have Your own name catalog. We drop at p order a Free details (secret Whitesalers but also I Chinago or Box 2056FF Ban Francisco

SAWDUST Turn it into cash Twenty methods I istructions See Charies Com-

THE Real Truth About Mail Order 25c. postquad I cases Downth Dept 22. Monk on Mary and

ADVERTICION back matches Cash in on his demaid so Union Late, marches, Cuts for all businesses and political parties—Free powerhouse selling hit ow prices—proterium gratatised on repeat orders Cash commission a Superior Match Co Dept PX for 130 Greenwood Uniongo

NATURAL moiding rubber, extra thick Pres sam is brock W Wootey 115 B thingld Peurta Lineau

LIQUID Number make flexible words. Free hample Chancy 1130 E 16th St. Jackton at 6 Fra.

MAKE Per ames Other Profitable Products Caleraba 1914 Choutess PS & St. Louis & M mourt

RAPA \$15 000-200 000 Annually Franchise protected Guaran sed minimum \$13 000 or makey back I be at hims No merchandise to buy Self-emploied One of the most exclusive and him competitive but sesses in Dorton States and Canada Send for free explanatory book of Harre's & Company Box A-2 Louisville. Illinois

MAKE flexible moids. Cast plaques, figurases Free mangle Tunker 636-A Chestaut, Hamilton, Ohio.

WANTED! Rome Producers by manufacturers in our Clearing Rouse Service. Become subcontractor casting plante products for these companies. Thousands products for these companies of easy to make items required for con-symer-industrial use Cash so at home without previous experience. Plantic Serv-Associates Dept 8-P8 Bast Boston 28 Manachusetts.

BUY Wholesale -sell retail Brand Name appliances watches etc Puli details Cutaiogue 50c International Sales Co 173 B F i h Avenue New Y rk 10 N Y

START A Buy ng Service buy whole-cole themsends on to a y advertised or d-ucts. Make big profits seeing at accepte discounts Pus card brings details American Buyers 627 8 Unden Buffajo N Y

to new factors are questione, a Brart in kirchen No amile Se i stores. Pres recipes S Hay Co 1605 South 13 Ave. Mar nespolts 7. Marin

OFF \$10.00 Orders by Man. 100 profits Everytoring furnished Terrell Bogard. Profit* Manager 1

MAILORDER "How-To" Small capital. sparetime, home beginners handbook 25e. Satisfaction guaranteed. Ballard Service-

POONE PERS Krep books 6mail firms Spare time Heffernan 37 02 Jeru-talem Aver 10 Wantagh New York

1706 WEEKLY New Invention Amazing 4-second Presto Emergency tire chains fit all modern auto whee a National advertising building hig demand I sales dany to oil statutes dealers etc make \$200 or more week y Terriory going fast Wir to Presto Chain Co. Dept. P-31 Des Mottes 2 Dime.

SELL To Car Owners By Mail, Full instructions - Everything supplied Orders P. ed Sing corvings Write Shidman 121 P. ed the carries Write Sh.

MAKE Perfumes other prid res Sed mat order Formula Cata inte F or In-ternations 6161 Parises PE-8 Chicago da I betab

THADE Magazines See current copies through our easy to get acquainted service Cookie from 6 387 cover as all fields errent List Pres Commercia Lagran ng Pub. ah ta Company 148 Borth Ritter 11 Care work of Indiana

MONEY in paw sharpening sparetime at home Report cash business. Experience past a Charles P. or Company Coumbin Heights M. alesots

LEARN Investble Reweaving! Harris Re-venyers, P.O. Box 7112, New Orleans 19 Louisson.

FRANCHISE opportunities authorwide Pascinating profitable business sillistions. Request a lurimation immediately National Franchise Reports, R-Jio, \$20 North Michigan Arthur Chicago at Lanota

CO-PUBLISHING management a or not-tur ties 10c P M T 6 2 Rogers fisteet A bemarie North Caronna

COLOROLAZID Contrete pottery made without molds. Patented method. Cemetary products, novelties, tiles. Basement eak-realing Maney-making projects. Booket. details free. Men ones National Potteries Grand Rap da Min. en. in

6250 WEFK repaired Free book 503 Odd Successful Businesses Work home Expect pometh na -044 Pacific-10C Oceanida Cauf et an

WANIED quarted men to be our facther independence brancia so tem 8 art private of the section of wattige regulators. Make opera time wurth 6,000 00 min thly When design qualified make \$1000 00 week, and up. Details on request Don t dear Territories limited. Scientific Den t de ay Territories limited. Scientific Electric Co. Box 2162-BD. Cleveland S. O.

JAPAN Imports! Unusual products indeed! Airmail \$2 00 Postal money order for valuable samples and catalog. Williams Exports, Box 30 O P O. Tokyo, Japan

EARN \$2.00 Hour' I do-maker # Sancadia Cai urnie

MANUFACTURE Greeting Cards. Attractive different Beats easily big profile. arrail capital, Start in home Complete Litho Publishing Co. 7811 p an 61 00 Aurora Beattie, Washington

'HOW To Build Your Own Madorder Business" Booklet 25c. W Jensen, 2579 So 25th East, Salt Lake 6. Utah

GET Dollars In Your Mail . . . Keep Every Cent-Orders Pilled Free Genmerco, Box 143. Dorchester 34-C. Mass.

START Venetian Blind Laundry Prof-Nable , frime business New marhine Free book es PD Co. 442 N Beneca Wichesa 11 Kabasa.

SELL Books Merchandise By Mail Cord Profits We furn sh circulars names - ah a your orders National Box 64 Dorthes er 22H Mass

PLASTERCRAFT molds liquid tubber players floor carde supple of Catalog at-d manual free Jaymank Plasters, Blue R de Ka Jak

HAVE Home Ma Bus ress Oct \$10 Or-ders to E ery Ma Keep \$6.00 Every-thing furnished Hutchisson Box 87-C Der hester 22 Mass

FRAE Form \$45 000 Un'imited Vacation's Plan No ca has a mujorder merchand se equipment Unknown W hall se home Keep job Hajalngs-Pfi Car ab d Castf

ELECTROPLATE Autoparts nearlines. mitters buty an et Easy Incapet stre home pricesses Pres bookset Ty o Metals, Box 11711 CQ Houston ID Texas

NEW Diferent Home Builtiers Ounoftunate Address M & Literature Feature ir a Real Mercha dise Everything fur-niel ed Mais 1753 B Garden Avenus. Larana Olive

MONEY Typing-Sewing' Details free. Edwards. 2015-PE. 12th. Des Moines 13. IOWA.

PATENTED idea. Turn discarded tires into beautif .. o. wer receptacies, New untional Wir duide opportunities Details for Treceast Box 178 A Ro2 Pants C 'y P r da

\$569 IN personal sed body record books Be by mais Eleven thousand new pros-pects daily Use same interature we do. No-Co-Re Ocksand 4-P Campania OPERATE our ator Manuarder Sys-

tem se a sur or dieta or a y ir due a Viry aut Write Se bieu Decatur 200 11 UNUSUAL pomework opportunity Spinhis a sin i rus Men women space-

BAINT Earthmorms ! Easy! Proft able! Done belies information, unusual Trust of Ar Lar Seem furned He Life.

Ent imatier System Ide El Monte, Calif. \$1 00 MAILORDER Dam. Lapte Mal er Prospects Every Home Circulars For-nished Prot. Gordon Products. Box 1032A Вугаещае 1. М У

RUNDREDS of wars to make money! Send for forder "A", Hillop Products. Room 949-P 30 West Washington Street. Chicago 2. Illinois

TELEVISION repair business \$19.36 toful cut. Amazing one day tra risk for studying Proven tech ique. Make \$15 to 120 day introduce 7 No experience breded foresigne Pres home bust emplan Write LB Engineering Box 4.13 Light Ph & North Hoggand Caulottia

ist Y it wholesale Manufacturers Distribitors Over \$50,000 items. Literature M.C. enita

Bur Was methods \$2 Er a 236 Coldbrook Grand Rapids Michigan

\$80.00 WEEKLY addressing postcards. | Instructions 50c. Roland. Box 351 Park-All d Pr -/

(Rr W M shr sim s Cecar a hind estdores Spare La lime year road We pay \$1 0 lb We paid B bb t \$4 le. 00 in few weeks Free Book Wash gron Mush-rum I d. De t 178 2034 Admiral Way Bee 10 Washington

BIG Money Home Plastics But ness Pres Cata et Bie Products PS-854 Wa erte an 72 Mass

PYRAM'D jour experse stamped en-

HOW to build your own mal! order business than t experiment send 25c for brooklet and Kin whom Cecul P Clover tr in City 1 Perima

346 FROM Square Foot Plywood: Jigsaw scessary Write: Woodart, Bridgewater Lecessary Ma sac asetta

Bt Y Who easle Thousands Nationally advertised p ducts Excusive large catajeg 3, 30 Hampion Same Company York, Nebrasta.

MONEYMAKING OPPORTUNITIES

ALUMINUM Awnings, Sell yourself Sell neighbors, Pactory prices, Write All Weather Box 18254, Tamps, Florida.

SPARETIME Profits Taking Subscriptions. All Magazines, Wholesale Catalog Prec Cassell Agency Westfield i N J

SELL Treatus gems 10 15 carst wantetase More by lard than Diamonds free Diamonite 1404 & Mitchels CRIA WHE Ouk a d 1 Cand

-01 FREE: 41 Profitable Small Busi-neres Ama I g ab ea 1.6 1.2 2 W rk Home: Start S are mr De mant But-rets Ketimore 21-T New York

ADDRESS Advertising Fostcards, Must have good handwriting. Box Nine Water-Lab to Mann

NEW T'vill' U tra-Blue Signs fe retail 50c. Samole free' Lowy, \$13 Recodway. Dept. 307, New York 3.

LUCRATIVE hobbies, book-list free, Shonback, 2717 Clement, Ban Francisco 21 Car bertine

Wholesale! 30 so Free Large Catagon of Nationally advac-Cameras Tapentalera Tuna Kitchenthe e etc. Start your own hour tell-oper about ma order best ess without capi-Wh severe start by k a furt saled No. experience accresses Outside of unique da ed Distributure Division 123 Box 1537 Paterna, 15 New Jeries

JOAN The Pro Judie Hobbies Prosperity Club You keep the document of proof In-Ave Buckes er Nes York

DETECTIVES Larn Big Money Experieran u ecessary Derective Particulars

Bt Y wholesale direct 10 000 nationally advertised products Bare poursed 50 . Make big in ey se g others bree Winderste Idea Na total Boyers Beryler Box 42650 Oaksood Cadlornas

DAR items and Bar gage at wholesale. resell at 40 , profit, Collins Products. Dept 3. Box 465 North Honywood Calif

MAKE money addres he envelopes aparesime, Osenway, 5713 Euclid. Correanne 3 Ohlo.

WIN contest money General Contest Buselin rive but diede of the Lists current cun ests and ruien. Sample 200. General Contests, 1600-A East 5th, Duluth. Milithon a

MANUPACTURE Rumerune and Pearl Jewelry at home Latest greatly is tremer doubler a no sk needed Postcard brings dissipated on and of settings of a cic A V. Cutt Co Inc 210-H

EXCEPTIONALLY Profitable Home Mailorder Business Plans. Lewis Burtlett. Highland Georgia.

PRIE Wholesale price information Na-2000 N. Ray or Ave. Junet. History.

MAKE to \$1.50 hour doing common pen leters & Nation at Atlista 8011 -C North

FARN Moties Evenings FARN Money Evenings copying and do had log count on the log count on the log for advertisers. Ad his constant A Buying Service, buy whole-

sale thousands nationally advertised products. Make big profits selling at sizeable dacounts. Postcard brings details. Ameri-can Buyers' 430-8 Linden, Buffalo N Y

SMALLER Payerers, Add to your in come New plant Pressure Drut Ad 10024 Max air Di e 85 Louis 21 Missours

GUARANTEED moneymaker at home work school etc. Write for sample offer. Petee's. Box 633 Toledo Ohio.

DOLLARS in your mailbox daily stock investment, plan 12. Gem. 44-B At-

START mailorder business without capi-Free advertasing method shows how Write Box 2001 Lawton Okashoma

\$35 WEEKLY addressing sovelopes In-

str c to 1 51, rejundable. Adservice. Spring Valler 26 New York TEN Magic Words has brought others

weath heath happiness II is simple accentific principle can also help make your success easier quicker Magic words p. 11 complete matructions \$1.00. Litho Pub shi g Co 78.1 Aurora Souttle

FREE Book "505 Odd Successful Busihesses." Work Home Exect comething Odd! Pacific-35C Occanade Calif

EARN 31 56 per order by just addressing envelopes. For information send stamped anvelope to Mox 1628 Mobile.

MAKE money at home, Write, Falcon House Winnebero 4, Illinois

FREE Polio 345 500; Understed Vacations Plan " No canvassing mailorder merchandiss, equipment Unknown, Works itself home! Keep job. Haylings-PS, Carlsbad, Calif.

MAKE Big Money Ruising Parabetts for our market. Positively no selling. Birds. Instructions furnished. National Aviance. Bux 4097-B. San Diego 4 California

MAKE big money at home No investment. We supply everything Full details \$ on Blind Ind street are Frederick Detroit it Michigan

UNLIMITED Earlings operating practical mall refer plats sing Jeapots? details free Tild erch Kales 36 E Langhorns Ave Havertown Pa

45 06 HOUR no seiling, Roland Box

GROW Musispooms, Cellar shed and sudden re. Spare full time year round We pay \$5.50 lb. We paid Subbits \$4.163.00 in lew weeks Free Seek Washing to Massessoom Ind. Dept 179 2004 Admiral Way Beattle Washington.

EASY living mailorder method brings high income monthly Others work for you We supply every high Compact of the structions and sample of 60. Der-Craft Box 268. Monroe Washington.

Repairing at home Inquire Modern Technical Supply 56-26 West 42nd Street, New York 36.

\$15 AN Hear preparing fan return a Experience is increasery. Details From Unit wat the M. Lakewad 16 J

20 FORMIJAN, PLANS, ETC.

FORMULAS -- Air Kinds, Latest products, Literature free Remte Pick Red e 15 11

PREE Formula Catalog Anything and tred 335 60 Western Chemical Salem Ore

t A TEST modern real formulas, list free, Moon Mark to N Y

PORMULAS 42 to Richard Rein, Chemist 266 Argyle Street, Valley Street, New York

MODERN formulas for today's fastest se one burn of products it els one tire Misser themsel 45:7-A lamps. Mot.da.

PLASTICE

PLENIOLAS sheets—cut to saze c.e.s.

all thicknesses—standard outder de sejurer t course McC stan Passion PO Box 1888 He avet Pa

PLEX OF Ad P be man Po venter Acesfare h by its Cas it con it playties. Past service who was rein, prices Catm of the tiem O I is Bun 6842P North Hillywood Can it a

PLASTICS home-craft course for Men and Wames. Tells and shows how to make hardreds of far or a projects. All plastics and materials for 23 projects. Included in course. No special tools needed. Course pays for (tself Write for Pres booklet, Interstate Training Service, Dept. D3 H. Portland 12 Oregon.

PLASTIC Sheets Bods, Tubes, etc. Free List. Plastic Supply Co., 2001 N. Grand P. d. St. Louis 7 Mo.

CASTING plastic, crystal like new improved formulation, I , pear de cuid Numoud and complete kil ascuding ee ora and matriction manua. You be, can stark profitable casting and embedding below at home Only \$4.00 pusional send to 5 regits Research Laboratory Lept. 308, Marion Virguila. PIBERGLAS-resin materials included in our complete plastics catalogue Van Horn Plastics, 1966 Ingersoil. Des Maines, Iowa.

41 CHEMICALS & APPARATUS

#2.K Counte Rays Watch Radio Artisty At Work Inducatory Controll Good Chambers 30-15 Free Brothung A once Laboratories Box 343 Berketey Ca 167508

No W Idea Chemics, and Apparatus Outfill it Homa Experimenting Placks Scales Microscopes Chemicals Books call and Lab ratory Burghies in Small Quantities Casang the Estat shed 1931 John H. W. 126 B West 21 (Spring) Leve York N. T.

illustrated Catalog Chemistry in states budgey for Ireer Laboratories Evanston Illinois

CHAM CALE and apparetus for Industine. at a private inheratories. Catalog 25c Dept M 26 B or scal flap, y Co. 11 6 Mt Hope Ave. Buches et 20 h Y

OEIGAR Counters \$29.95 up Free Catning Atomic Laboratories. Bus 343 Berkeley, Cantortia.

O MELP WANTED

PORETON as Latte American Employment 1956. Princips Serving Direct by a see Up To-Minute Packs on Military & Cilian Cuba ruction. Government John Major Off Lattings Aviation. Transportation Measure p Lines Mining Importers Exporters. How When Where is a saly as a leasure learner. How when Where is a saly as a leasure of Chinhal Reports. Box 30 8 N. 2 wood 20 Capit

Al ANKA Last American Prontier

100 brings 1834 Burness Directory &
Generalized Map Military & Circhan
Construction Homestead & Highway facts,
Mining, Aviation Fur Farming Orazing
t moor Travel directions List of firms
heing How to app # Alaska Opportunist
July 17 9 Manywood 28 Calif

ADDRESS Advertising Postcards Most have good handwriting Box Miss Waver-town Mass

CALLY ORNIA Employment Callionics a population increasing over 400 000 a year second part of it Have a obtain distribute information guara teed to decentury. Box 4644, Lee Angeles 48 Calif.

FORETON — U.S. Jobs — So. America. Alaska, Spain, Fare Faid. 1800's U.S. jobs to \$18 000. Trades. Office. Factories. Send stamped self-addressed onv. Job Opportunities. Wasses, 3O. Minnesota.

MIAMI Melp Wanted Columns leading newspaper nirmalled \$1 00. Box 71 Mrami of Florida

SOUTHERN California—Job opportunis tes of Business opportunities Real ostate and Rentals Air Maried—61 00 Article 1923—8th Avenue Arcadia Calif

MEN Warred Now for Five gn C notice that employment on Ame can Barry to Fall of the Sail of the Fall Mark and at et con the Trank D very to 11 hour C e an 11 of hour trank D very to 11 hour C e an 11 of hour trank D very to 12 hour Labe etc. \$1 of hour transporters \$3.70 hour Labe etc. \$1 of hour transporters at \$1.00 hour transporters and all over 60 hours. Transporters on a d to 26 month contract. A so John with Saip C Mr. og Asia, so in the said result related to 26 month to 28 month contract. A so John with Saip C Mr. og Asia, so in the said result related to 11 the said related to 11 the said related to 12 the said related to 11 the said form the fall political transporters to 12 the said related to 12 the property 12 of a 12 the said form the 12 the mailed to 12 the 12

\$245 PER Week overseas! Clerks, truck drivers, cooks construction men guards, office worters laborers, carpenters electricians mechanics, angineers, teachers, for any fivers this worter excellent time. No exist elected some abs 257 prijects 31 court my Plants est bulleting Plants Seek in Apicar a Count et all plants apical intro but us tated 36 pages a quietalists 3, Johnsteine Del But 36 Billings, Michanic

piece MONTHLY for truck drivers \$1400 most y for carpetters electricate pleasers weeks are \$200 for cerus and laborers He, acement having new bring door Pull tolormation and complete foreign listings with current anti-mation on Spush Korus Australia. Augha & Canada \$100 to 000 mem and women needed for new stateside propertication of the post of the pos

ATTENTION Construction Men file Truck Drivers—Carpe ers Mech age - E er rich a Clerks Plumbers Labirers Kiel cers Alpervisers Many Others Laist Constituted Reports in the to contact for highest paying jobs in over 42 countries, including U.S., Spain, Bouth America A sake Estupe Africa etc Pay up to \$154000 for my Transportation paid thouse tax relef adventure travel otertime many other advantages. One year registra on and advancy service Application forms Orly strates with theorems of same, moves back guarantee of interfaction forms Orly strates and all places. At the Alphabeter Box 1067-89 fit Louis Measure.

LAFEST employment information Greenland. Interest Rehires, Spain, Alaska may others luned \$1.00 Fireign Job information Bervice Box 667 Minutespois. Mini costs.

CHICAGO has the jobs Help Wanted columns arimated \$100, Mortenson, Box Mr. Ct trage is tion

NONTHERN Jersey Relp Wanted and Rousing & umns \$1 00 a rma, sed Adaersice, 327 Stellen Avenue R dgewood, N. J.

AGENTS WANTED

AGENTS 300's profit setting genuing pold willdow setters stores and uffices for samples. Metable Sign Letter Co. 45: E. Nurch Clark Chicago.

START Four Own Business on credit Your and been jabl of our Design and at one to all to our Design and at one to all to our Design and at one to all too home necessary by an analysis of experience unincreasury Programmer producting business backed by world-wide industry Write Rawleighs, Dept. E-U-PSC Presport, III.

NEW Jobs open in pelling! Send name, address for five free lasues of Opport, dry blags use a money making guide lighting to disease of companies who if pay you wer; full or part time. He experience treaded Opportunity 28 S. Jackson Dopt at Cricago 6 Instante.

ABSOLUTELT Pres Sains Est Tours for the asking. Bend postered today requesting Est showing new line help by these with your rame of personal injuries, one budges choice 2006 d figure t emberon Write Moult-Fast, But 1432-pt. Pr. s. denze E. 1

COLD or the ver letters numbers Witsthere Proc Fracks 1 to 6 300 Partiits Proc Sampies Atlan-U 844 West 78th.

18 \$210 a week worth a postcard to you? Then rush oatd with name and address for their an area for the Automate Refrigerator Demaster to be ease? Write to Mr. Leus D-Prost-O-Matic Corp., Dept. P-161 173 W. Madison, Chicago J. J. note

CHOM? man can make \$2 000 next \$00 do a his r house in a wa war to amazing held for a san a curboide numbers. Automatic free trial plan page profits day nited day. Write for free details. Millite, 173 W. Madan a Liept 107 Chicago ? In

HAVE a complete store in your pocket. Buy wholesale and make hig profits. Send for free general merchandine datalog now Jay Norris. Dept. PS. 445 Brooms St. New 3 ** k t t **

MONEY For Emas! Make \$16 and more during spare time. Prie da nelle billion eve time billion from Emirated Crissimal Carda in As Int le as 36 Persona red 2 a 2 nerv. Napk 114 Large. On t. Wilap pittes with Free accessores. R boon Tire

at the quality Mostey Bay, it Values No experience Needed Peral Name and Address for Free Portfolios Catalog Asserbe in the Approval Belief Fan East tan Portable Co. t Shop Makes Miney Post Day Wake I day Elmira Urecong Card Co. Dept. C 304 Elmira New York

IT S to terrific you it actually sell Thousands. It and new \$2.05 pucket of ech protector. Sales pour in A trainer doug dear for you. Get your town today. Federal Products. Evanston 15. Illinois.

CHRISTMAS Cards pay 756 peofit on \$1.25 assortment, Exclusive 46 for \$1 Hame Empriots, Gift Wraps By-The-Yard, 208 new fast sellers Cash bur-us \$ Assortments on approve. Cardinal 1988 State. Dept. 80-1. Cardinal 14

NEW Bathroom Daudstizer Manga on was Bantshes offers bathroom katches, Inch north services for the sent on trial. K istee 56 Atron. Date

ADDRESS Advertising Posteards, Must have good handwriting, Box Nine, Waterlaws Mass

AT Last Remething New and Sensational in Charlessa Carde Make katra Marcy Past? Saw Battan Yessura Metalica Cera Bass Orders Pass up to 100 cesh profit 10 Pres Bamples With name 50 tor \$1.30 Big line Amanica new Giller Brite Occurrents Naps na Onlis Statione vi Beneral \$1.00 Binner on approval Part Greet nas 2001 Lucust Dept. 661 K. Bt. Louis Ma.

ANYONE Can Sell famous Hoover Chiforms for brauty slope was resemble surses dectors stated Ail popular miracle fabtics bylon decrup stion Exclusive at his top man by Buy cash should be we real fature Equipment free Moover Dept E C, New York 11 N Y

BIGGER Profits stiling Oreeting Cards Get in of senses that Factory Surpairs Hargaria & 25 bases for 50c & bases for 36c at 10 they met. Big lam new 1956 Christman Cards Stationery O'lls Assortated on approval Personalized Samples Free: Midwest Gards 1113 Washington, Dept. H-136, St. Louis Missouri

TO NEEDLEBOOK with threaders \$7.20 gross, 31 piece plastic Christmas decorating hits \$3.00 for 10 sets, 5.001 other Barguint Mary samples & ratable 5.00 Mails do es. 20 West 33rd Street, New York.

BIG Money making opportuity Exclugive like work as firms Jackets purch shirts covers is advertising embriddered Erest bust one prospect Outfit Free Manter Dis. 204 Water Liebuser Indiana

S10 506 PROPIT So no Printing Matches Specialisms' Arrive Sealer to a bow he did it in glant live as as outhing the can do it too without supersonice Write Arrow Press. \$21-B Pourth Ave. So Minnespotis, Minnesota.

AMAZING Profits For You selling Subshine Quality Christmas Cards. No Investment or experience necessary Hatlonally Paraous 21 Cards for 21 00. Sails on Such Imprints. Currier-lives, Relations. Clift Wrapt many others hamples on approval to the State, a Art Studies for Dept Ph. 8 Springhold 1, Mass. Pasadens 3. Capif Mate East of Rurition address Springhold 1980s.)

CA' PNDARM Adverting Suvertion Matches As at the United Structure of Revenues 12 sheet Oids, Hundreds of Adverting Nove its Bank Maches etc. Fleming Calendar On. Promotional Division, 5500 Cottage Grove United 37 Inc.

MAKE Money At Hume as renewal headquarters for all magazines. Liberal commissions. No experience—No capital needed, Supposes furnished. Wrate for Free Catalog McGregor Magazine Agency Dept 510A Most Mass to London.

MAKE Money Fast—for yourself church organization which is so in the first of the continuous and all Occasion Orecting Cards Leading 21 eard boxes Rainstons and novelly as sortments. Odd Wrappings, Stattonery Children's Items Grits, Gadgets, Deluxa Improted Ct. Firms in do Over 200 items by fits to two Exercises or a continuous Free will be present the fits of the fits and the fits and the fits of th

ADVERTISED watches diamonds, pens wholesale. International, 51M Roberts Portland 6, Ma. *

SELL New 3-Dimensional action Christmas, Birthday Get Weil (a de Make \$56, 275 \$100 extra money Profits to 120% plus extra cash bonus, Write for Feature amoriments on approval, free baths on Free a Carte has for the Lo ery free cast Cash for the Lo ery free cash bonus.

NUN spare-time Greeting Card and Oift Shop at home. Show friends samples of our new 1954 Christmas and Ail-Occasion Ordering Cards and Gifta. Take their neders and earn to 199's profit, He experience necessary, Costs nothing to try Write today for samples on approval Redail Ormetican Dept. 102 For due More

BLY Whosease lent set for due More BLY Whosease le Bo Descou la Preel Large Catalog of Nationally advertised appliances, gifts, watches, jewelry, cameras typentiters has a scherware ste Blatt your own has y as's operation who established business without capital Whosease starting hits furnished by experience necessary Out! e of us goe automatic sures p an included Catalogical Distributors, Division 121 Box 1827 Puter-sou ab N. J.

SHINE Shoes Without "Polish" New Invertion Lightning seller Shoes sleam, the in flor hample sent on trial Kristee to Akron Onto

CARH Commissions—Up to \$10 per hour Sell new and exclusive Outho-Vent Siring Trep cushion shoes. Call on his test places industries and individuals offers the Union American a most comfortable shoe High commissions cash bornies and exclusive repeats build you profitable business quaratteeing meurity. Fire sales hit No Experience Or Investment Needed Write now Ortho-Venture Co. Toe. Dept. PS 254 Select Va.

GET Into Toys Show sensational tay finned back tablecioth. Pree toy gift line. Take and a Jaley profile. Styless, Dept. To.5 (compare 10 Ohio.

100 CHRISTMAS rards \$2.25 Agents

SEND postcard for Pres Money-Making K i guaran end direct trom Mill hyloma lingerte historie men a and children a wear American Mills Dept. 436 Indianapous

CALIFORNIA sweet smelling boads, seneathors) or ord Parties are free Mission. 2323P West Pico, Los Angeles & Culti

Profit! Pres enteple. Apartada 2016. Mex-

MAKE Money Introducing World's cutest shifteen a dream his selection adorable styles Law prices Complete file, or fire Rush hame Harlord Dept M 3041 Cincinnati 35 Ohio

MEED Extra Cash' that it so ing Blair's unusual line of household and food stednets. Every housewife a prospect. Products sent on Proc Trial Write Blair, Dept. 55ML Lynchburg. Va

98 98 PROPIT per donen, Sell magnetic proc in the treases ciert. Microston Cu. peration, 3406 Cabustian Manywood

START your own money making discount business Buy blassess basiness for blassesses advertised Appliances Water on Culture Experience, Inventment annecessary has a culture Buyers Service Buy 454754 Oakland Ca forms

EXOTIC African Import Benutiful genuine handcarved saint set direct from Africa Bets a fur 63 00 Samp e 81 00 postpaid plus guantity prices. Knopper 63 We thury Averue Mineral New York

REVOLUTIONARY! Englusive! New two localities, safety and accessory Instantise of Cant profit pair No competition levelstories open Parial Machine Works int type Avenue Dept Pa-16 New York | on N Y

EASY Extra fromme He I Bernatheral Hew & Icone Sector Hes sta t Ifour & Board & ver Good Househoring Approved Terribe & 18 sector Sector Free complete sector X t Nam, a cover \$1.0 Me en Producta Sep. X P.O. Box all Midtoria Statuts New York 18 X Y

tut articles, Sample free Summade Company Brockton 64 Mass

BUY Who, essele thouse, de nationally advertised products at big discounts. Free Who, essele Plan." American Buyers', 629-8 Linden, Bullalo New York

SENNATIONAL Who came we'ches rings appliances. 1854 estableur 500 1 terms tional Sales Company 173 SA Frith Avenue New York 10

A Posteard Can Put You in A Pine Business! Complete line. Leather Jackets. 140 thos styles. Big commissions. No experience, no investment. Send posteard for Pree outfit. Mason Shoe. Dept. MC14 Chippewa Pasir, Wilsonsin

GET New Shirt Outfit Free: make \$86.00 weeds on a average orders a day Famous quary Made to Measure diesa and sport shirts at \$2.05 up sell fast to an men. N. esperier ce needed. Puls of part time. We to Parka dishirt On Dept. 707. To re Maute 11 diana.

OR. FNIAL Christman cards But 70c.

IMMEDIATE Sucreta Sensa o al profus' Su a \$1.75 Partir Aug Division 20g Snum 20g Operate from close boone car Pres catalog Superior 1250 h Jefferma Chicago T

NEW Chemical discovery Pro Auto Wateasy way to car beau a Free ear-ple the formation America profits. Burioté Auto-Pa vive 1800 20th Street, Santa Manica Fablurate.

FREE book "506 Ond, Successful Bustnesses," Work home! Expect something Odd! Pacific-28C. Oceanside, Calli,

NEED Money? 350 00 Yours. Sell only 100 knees New Christmas Cards. Other against offers Free amprined imprinted to de Peacure but assertments in approva. Free Catalogue 100 profitable items. Work with a national leader. Write today—Pon 'M Brush Dept. Ps-6, 130 Duane St. New York City 13

BUY Wholesale 450 800 Products, Literature Pres. Carter Box 8011-G, Chicago 80

NATIONALLY advertised appliances contware diamonds, watches, typewriters, etc. Wholesale catalog 50c — J. J. Davis Co. 30 E. Englaweed Avenue. Englawood, New Jarsey

PREZ Posto \$45 000 Unimited Vacations Plan. "No canvasing manorder merchandise equipment Unknown, with itself-home! Keep jeb, Haydnes-PE, Carlabed Calif.

MAKE Ertra Money. Sell front door name pates to friends, neighbo. a. Retail 5: 96—you make \$1.00? Pres selling hit Modern Engraving Co., PO Bux 184. Beaten 14 Mass.

DISTRICT Agency Chain saws Wheel woulded Power mowers Sales service Exclusive Parmos-PS Excellent Springs Mo

SAVE 50-75 On household appliances Free particulars. Whosesale catalog Euchlings P. bicklervice. New Jorgey

MAKE Moves with fest-origing to a traine Starts Spare time for time Section at actual sample fabrics, Free Bostonian, in Buston Dept. F-11 Boston 30 Mass.

BALCHMON make big money with Beauty Auto Arm Rest the new auto ag censury protects are Irom but foor it is top profit for you and merchania McPuti Co. But 226 Stock found 1. note

Direct facemen his order deniers Here a quick pro in Unber enable same bring made Amaditic new Clean House family in poster burn like streetse his amail firstig and enpower acts or hard shelled it sorts within two house Effective up to say weeks fully no finish my aparts tougenteed to poster board sell for \$1,100 profit One taken rempary in d. 26,000 is no in de days. Test mult order results overwhelm, ig A priored natural resident control for you finished profits just watern for you finished or prepared to determine the distance of the company 15000 Crossroads Los Augelia 28 California.

\$2.00 PROFIT seiling \$2.95 photo entergoment offer Allen Studio. Reigier is de Lartie Rock Arkansan

MAN to earn \$150 up per week, Long Meeded invention. Advertised mandands From series everywhere Fun of part time Est as se No investment Pres use of samples. Write Red Comet, Inc., Dept. 2-2 M Littleton, Colorado.

H RIGH-GRADE BALESMEY

AD Matches Bell Amazing Designa-26 50 66 a.d 240-light book matches. It erest spot cash commission every business a Dringert Low pines for high qualsty Repeats Start without experience wen a site fun part time Buy Norhic Sales all increased Match Corp Dept Po M Chicago 42 filesom

Aftivities with matches. Cash pages to bug deriva di sest briton antel matches. Cash of all butters and political perties free pour account se ing kin I or post post to guarantized on repeat offers Cash nomin seven Superior March Co. 28pt. 1 854, 2500 Greenwood tricingo

EDUCATIONAL & INSTRUCTION

45

BOOKKEEPERS! Increase your caraings! Operate your own simplified Dullar-A-Week! Bookkeeping and Tan Pertice. Pull or spars time. Details Free No obligation, Elia, Box 263, Cedar Oreve Nor h Larolina.

USED Correspondence Courses and Bucks sold and rested Money back guarance Cutaing free (Courses Bought.)
Lee Mississus Placeh Alabatas.

COMPLETE Your Eigh School at home in spare time with 5" year old school. Twite turnished No classes Diviona. Information booked free. American School, Dept. 3C-44. Dress; at 18th, Chicago II, Luneau.

WANT A Diesel Job? New Opportunities to increase income. Histor Pay. More Money We can be p you Qual. y Toots Shop method home training Write today! Diese. Tractor Heavy Equipment Devision Internal of Training Service. Dept. N2-H. Portland 11 Oregon

PHYSICAL Therapy and Message We train you at home, Earn his profits from your own private practice of work with hospitals and decrease Free calmog National Irst tate Deak 2, 486812 Sheridan Read Chicago 46 [1] 174-18

RE a Real Estate Broker Study at home. Write for Prec Book today 'G I, Approved' Weaver School of Real Estate 301 Law Bldg Kansas City Mo

RIGH School diploma at home. Licensed teachers. Approved materials Southern States Academy Box 145 P.K. Station E. Alanta. Georgia

INCREDIBLE) Become Menial Superman Overnighti Pres Booklet! Bijou, Box 1727-VO Hollywood 38, California

STUDY by correspondence for Doctor's degree in Psychology Metaphysics and Divinity College of Divine Metaphysics, and Dept P-8 24:1 No ligitude Street In-dispapolis 4 is dama

PIANO Tunity Pays Learn this profitable of ession at home easily with patshand formmeter and mechanical aids. No knowledge music necessary Diploma | graited Veteran approved. Write for booklet, Nies Bryant School, 2731 Stockton Bird. Dept. S. Sacramento 20, Calif

PRACTICAL Nursing—Learn Easily at Home, Spare Time, Big Demand, good carmogs blish School not measure Write for free facts. Wayne School, Dept. Fit-35, 2523 Sheffield Chicago 14, Li

BOOKKEEPING—Self-check gourne a se so, Free Adaptability Test-Write F D. Lancomb 1436 M W 20th Okiahuma City a Okia

WEI DING training pays at Hobert Welding School. Box P-841 Troy, Olifo. VA Contract, Best emploment. Catalog Free.

BECOME a Doctor of Psychology or Mrischwart Leath secret of contentment, | happiness. Win degree of PrD. or MsD Solve mental worries. Free book. College of Universal Truth. 5028-E Broadway Chicago.

GOVERNMENT Position! Home training for Examination, 49 35 Refunded if you don't past, Weste. O. ment Instructions, 47-Cel-Box 445 St. Louis, Missourt.

HECOME a mental marvel. Throm away that calendar Learn to tell the day of the week for any date and year mentally Attack yourself and your lineads. Very little memory required, Easy to follow instructions \$1.00 To-Mental Company 3449 Tampa Houston 21 Texas.

SIMPLIFIED method leaches atgebra instantly 3) guaranteed. Ziemben, \$123 Orohard Dearborn, Michigan

OWN A Collection Agency, pays big Frankin Credit Rosnoke 7 Virginia

MFDICAL Laboratory Technicians in great demand. We train just in your own home Cata once free Imperial Technical Institute. Box \$73.8. Austro. Texas.

INDIVIDUALIZED instruction is mathematic topics square root factoring descriptions and quadratic equations Details free Hosea Dover 2354 North 8th Screen Managers 5 Wisconsin.

EARN While You Learn Auto And Diesel Mechanics. Master this top paying trade Many graduates earn \$100 a week and up. Approved for Korean veterans. For free information write Dept. No. 261 Nash-time Auto-Disser Conege Mashvine 3 Tenn

FRAN home study course in basic tennomics offered as a public service Heromamended by many leaders. Send postcard for complete 1 formation. Her y Lapiter School Dept P 50 E. 80th Street, New York 21 New York

APRAID To Talk Lack coundence in the sound of your own voice. Amazing home training plan quickly given you strong couldent visce. Free bank et gives facts. Write Prefect. Visce Institute. 210 South Clinton Studio 256W-1. Chicago 6.

PUOR B Scientific Wheat Trading Course" Ambassador Station, Los Angeles 5, California

MEDICAL Laboratory Technique, Learn at home, Catalog free, Century College, 9 East Ohio, Chicago 11, Illinois

LEARN Sewing Machine Repair Ouaremand Plan Assures Success Write Purdy But 207 Weatherland Texas

DIPLOMAS, Home-Study degrees, folder #192 free Aures, 154 West 73 Street New York City

MIRACLES via Subconscious Control Free Autodynamic Brochure. Box \$47, Ocean Park Cal.(

EDUCATIONAL books, correspondence courses, bought, so, a rented, Free Catalog, Willard Bayles, 211 Essex, Rackett-, sack New Jersey

ADVANCE Faster? Speak Effectively 12 Chamberlan Method Box 351 Mill Valley California.

USED Correspondence Courses and Eduestional Books Bought, Sold Rented Catal-g Free Educational Exchange Summerrula Ga

RECOGNIZED College Degrees through | home study Tahor Colleges. Box 512. Reno. Nevada.

GROW Mushrooms, Cellar shed and outdoors Spare full time, year round We pay \$1 to 15 We paid Habbit! \$4 145 00 to lew weeks, Pres Book, Washington Mushroom Ind. Dept. 180, 2854 Admiral Way Seattle Washington

CONTRACTA

SEND 50 cents for list and details of world famous competitions enormous prizes. 8. Punter 6 Laval Road Montreal 5 P.Q.

SURPRIMES Culture"!! Published Home Income Opportunity Long totablished contest hadra. Send stamp' National Contest Review. But 20th h. March, 16 F1 rids.

T DETECTIVES

DETECTIVE Training. Phillips Secret Service System. 1917-C Morth Kenneth. Chicago 19 III

DFTECTIVES Work home Travel Expessence unhecessary Detect to Partico are free Winte Wagober P-125 West 2012; New York 24

INVESTIGATOR Training, Experience unnecessary Many opportunities, send for Pres particulars. Pres credentials Exchange Secret Service System, 4366 Broadmay. Obicago 13, Illinois.

AR LANGUAGE OUTSITS

arraphone. At home quirkly, easily learn to speak French Spanish German. Russien, Japanese- M languages by Lingua-phone World's Standard Conversational Method its the living in another extracted Seas time work in-tex fand in Free Book Linguaphone Institute 5400 RCA Building New York 20

IN BUSINESS SERVICE INFORMATION, NAME LISTS

MAII INCI Lists most any classification.
1000 names \$5.00 to00 your circulars
ma ed airts outs \$4.00 to00 your circulars
printed and mailed \$12.05. Write Dixle
Matters King North Carolina.

TROUBLE getting Capital' Concerned about mathet og pluna! For tried and prises method mahing effective presentation of your enterprise obtain Hasin Pindimensals of New Enterprises. Photopaid 62. The Rover Research, 630 South Orand. Los Angeles, 17. California.

1 000 ADDRESSES on nummed labels 87 00 C. H. Butchison, 4167 Hemphili Port Worth 15. Texas.

1 SPECIAL SERVICES

PLASTIC laminating of cards photos, documents, etc. Up to 2x1"-50c, up to 2x6" or 3x1"-\$1 00: up to 4x8" \$1 54. Prices for plastic sealing any article. Joseph Lush Box 50 West Cornwall, Conb.

LETTERS Remailed from NYC 23c each, 5 postcards \$1.08. Van Buren 87 M. Main Street Pearl River New York.

32 AUTHORS SERVICE

NO luck finding a book publisher? Write for Pres Book et Pd. Vantage Press, 120 West 31st New York

BOOK Manuscripts Invited -Co-operative publishers since 1925 Meador Press, 374 Newbury St., Boston, Mass

HAVE your book published by Felson-Hall. 210 South Clinton. Chicago 6. (Founded 1900). Proc Scialia.

13 ADVERTISING, AGENCIES, LTC., FOR ADVERTISERS

ADDRESS Advertising Prateurds Must have good handwriting, Box Nine Water-town Mass

MAIL order advertisers, use the big ten 35 million readers. Free Booklet, Diener & Dorskind, 147 West tind, New York City RRs \$100

30-WORD ad free with year subscription \$1.00-Christian Citizen, Ann Arbor Mithigan.

PAINTING, CHALK TALKS

How To Make Makey With Simple Cartoons A back everyone who likes to draw should have it is free no obligation 5 m, y address Cartoonists Exchange, Dept. 1886. Pleasant Hill Obio

CARTOONING self taught, complete course only \$1.00. Cummings Studio, 2009 Und Street, St Louis 4 Missouri.

COMPLETE Drawing Course \$1.00 Richmond Enterprises, Box 1903, Augusta Georgia.

MAKE Day-Glo daylight-fluorescent signs. No experience needed Starting kit \$1.00 Edward Cook, 51 Martin, Saratoga Cythoga New York.

TYPEWRITERS &

TYPEWRITERS, Printing Devices, Otfice Macrines supplies applicates, Diale Orach h. c. N. cen Caro, pa

MONEY Protected Protectograph Checkwriter Pres Literature, Box 777-P, St Louis 1 Missouri.

TYPEWHITPHS (boy) surplus office also typewriters \$25 up From first, Monthing 550A Lynn, Maident Mans

PRINTING, MULTIGRAPHING, ETC

HETTER printing reasonably priced Bamples Fathmates Write Reporter Chel-sea Ocanhoma

Hitt Print a free beads Envelopes Circulars, Printing, 31 Barciny Portato et a Virgi

OFFICE printing to 50 1000 \$7,215 16 16. National Letters, 1657 Broadway New York 36

ONE Thousand Highersde-Business -Proceed-out Person Printed Carda On v 54 55 postpani. Pres cut service. Send Rample Text with order now Mayer Box 62 Mediord 56 Mass

PHEE samples Air maded fast printing service. Postpuid D & M Sales Ou. Sebastopol. Companies

BUSINESS personal printing Samples free Mc., vaine But 34-P Brooklyn 26 New York

PRINCING moneographing office supplies. Pres samples. R. Bailey, Monterey Transpared

CARDS (Business-Personal) Plateless Engraving 5 lines 500 cards card-oase 44 00. Jerry Plynn, P.O. Box 247 Finalics New York.

QUALITY Printing. Resonable prices. Good service. Free price list, samples. Southern Printers. Atma Georgia

500 STANDARD Letterheads or Enveleyes 55 m Pas paid Expert M O printers Free catalog Arthur Steinbergen, 1274-L Stebbills, New York City 50.

PRINTING OF TEITS, SUPPLIES

DO your own printing. Save money Bimple rules. We supply everything Print for others, good profit. Raised printing like angraving too. Have home shop. Detail a like Ke see Presses V & Mer den Conn.

MAKE your own sell molding rubber stamps and printing outs. Pleasubour Arts v 3. Wisconsin.

PRINTING Presses, Type Supplies, Lists 3c. Turnbaugh Service, Loysville, Penna.

PATENT ATTORNEYS

C A Snow & Co. 8-427 Snow Building. Washington I. D. C. Registered Patent Attorneys. Write for information

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent. John R. d. pb Reg. and Patent Attories 207 Cd. to an R dg Washdigton 1 D C

Cd. ban Bdg Washdotten 1 D C REGISTERED Patent Attorney offers services. Sanders, 443 Evans, Chicago 27, INVENTORS Learn how to protect your invention Special bookset. Prient Guida for the Inventor containing detailed reformation concerning patent protections of procedure together with Record of Invention form will be promptly torsanded to you up a request without obligation. We are registered to practice before the US Patent Office and prepared to serve you in the handling of your patent material Carence A O S on a first py Jacobson, Registered Patent Atto. 1879, 428-G District National Building. Washington, D. C.

INVENTORS Send today for bookiet "Patent Protection for Inventors" giving detailed patent information and preliminary state to take toward patent protection, also "Evidence of Invention" form Victor J Dana & Co. 241-J Merlin B dug Wash 1:34-m 6 D C

INVENTORS—If you believe you have an invention, we can make a preliminary starch on your invention and advice you whether we think it can be patented. Send for copy of our Patent Bookset 'How to Protect Your Invention' and "Invention Second" form. No obsigation. McMorrow Berman & Davidson Registered Patent Attorneys. 143-D Victor Bunding Wesh-negton 1 1) C

PATENTS Irving 1 McCathran 316 McLachlen B.dr Washington I D C Registered Patent Attorney

INVENTION Record form free and Patent Intermets in Every Inventor Science Have Car M for Registered Patent Attorney Wiselworth Butsdam, New York

'INVENTOR'S Cuide' and 'Record of Invention free on request Prank B Ledermain 154 Namen Street, New York City

INVENTORES When you are satisfied that you have invented something of value! write the without obligation for information as to what steps you should take to serve a Patent. Write Patrick D. Benners Breakered Patent Atty. SM Columbian Bidg. Washington 1. D. C.

FOR INVENTORS

INVENTORS—Send for free patent information book and inventor's record Regule ed Palent Attar or Assentate Evan or Pate t Office \$23 .525 Palent Attorney & Advisor Navy Department 1936-1947 Gustava Miller 54PSI Warner Book & Washington & D. C.

INVENTORS If you have an invention for sale has enjed or unpage ted write to attitute of American Inventors, Dept. 30A 63. K St., N W Washington 4 D. C

INVENTIONS Prove led Parented of Departured Established Still Wile Adam Fisher Company 5418 Idaho St Louis Mo

INVENTORS. Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John Handolph, Registered Patent Attorney 206 Columbian Bidg Washington 1. D C

INVENTORIA Learn how to prefer tour threation Special back et. Paier Courie for he inventor containing detailed to formali in concerning pale it protection at dip occative upon the will be promptly forwarded to you upon equest with I obtion hit We are treated to partire before the U.B. Patent after and prepared to serve you in the handing of your patent matters. Cause of A. O. Brief & Harvey Jacobson Required Paier t Attorneys. 42A-G. District National Buildaing Washington. D. C.

INVENTORS—If you consider your intertion to be something of importance take steps to protect it with a United States Patent which gives you the right to exclude others from making, using and selling your invention as claimed. "Patent Protection for Inventors" outlines steps to take to secure patent protection. Maked if supply who it obtains her like of James & Co. Merlin M. Evans. Registered Patent Attorney \$43-3 Merlin Building Washington & D. C.

INVENTORS If you believe you have an invention we can make a pre-imitary bearch on your invention and adone you whether we intok a can be pa ex ed fond for copy of our Patent Backer. How to Protect Tour Invention and Invention Beared form No obligation McMorrew Berman & Davidson Registered Patent Attorneys 141 C victor Building Washington I D C

INVENTION Record form free and Patent Litermation Every Inventor Should Have Car. M or Recatered Patent Attorney Woolworth Building, New York.

"INVENTOR" Cluste" and "Record of Invention" free on request. Frank B. Ledermann, 184 Massau Street, New York 36, New York.

PATENT Searches \$5.00 including patent copies Same reliable search as einducted for pate t afficiency. Free protection forms prompt emilent service Patent Service lost tute \$65 \$ Punnsylvania Aresise Washington \$ D C

BEARCHES Put your patent searches in the hands of a Registered Patent Attorney on Azent as he quasities to give a worthwhile patentability report Record of inventual form upon request and information on patent protection, Patrick D Beavers Registered Patent Attorney 338 Columbian Bidg. Washington J. D. C.

CASH For your ideas 200 Manufactorers head inventions paterted or unpaterted Last free Jurent on Sureau 200-8 Clinton. Out Park Hitools

GO Florida Winters-Maine Summers. Sell unpatented invention like I did. Intermation \$1.00 Upsen. Brownfield 1 Me

PATENT Searches \$5.00 48-hour sizmail service. Record of Invention forms free Write Putent Engineering Service, 711 14th Street, N.W. Washington, S.D. C.

PATENT Searches to 80 46 hour service Free Record of Intention With a Raymond L. Smith Patent neuroper \$22 Sharaton Building Washington 5 D C

PATART Reserves including copies of measure patents to 66 Reports a imaged within 40 hours More Unit 75 required patent attorneys use my service Fox Fire invention protection forms, write Mass Ann Hastings, P.O. Box 176, Washington

61 INVENTIONS WANTED

INVENTIONS wanted Patented apparented. Tremendous Manufacturers lists Global Marketing Service. 1604 Mitchell. Oakland 1. Calif.

INVENTIONS promoted Palented of Sign to ed Batabassed 1911 Water Adam Visiter Company Sant Idaho St. Louis Mo.

INVENTURE IT your invention is adaptable to our histories we will contract or read or forally 1 less we will try to place Pice be kell Kell or Saids Outputs-like 184 Premiant Ohio

INVENTORS Don't sell your invention Patented of Unpatented until you receive our offer write Cowgoll Box 286 Marion O

INVENTORS Hundreds of manufacturers have requested our assistance in foretry thanketable new poducts. Complete information free limiting of American It replies Dept. 10C. 621 -E. Street. N. W. Washing on 4. D. C.

INVENTIONS Wanted Palerted or Patent Pe d og 20 pea s experience Promot ing Inventions. Na 1974, Bernice Solvan 1422 Meramec &t Louis 18 Ma.

PAIT WTRD unpatented inventions. Complete promotion service Pree partieulars expert advice and invention recording Superior 135-342 North Rodes, Beverly Rills Calif.

INVENTIONS Wanted Patented Pending only, Inventors Patent Exchange Hartford 1, Coun

WE have manufacturing connections tapital And energy We need your inventions. Write Inventor's Mart 628 Esperson Bidg. Houston 2. Texas

INVENTIONS Wanted Palented unputented. Send for free form "R," Othert Adamee Patent Broser, 2 Park Row N.Y.

OR PATENTS FOR SALE

OARACIE Sour seal word meta patent perdag Fred Beck Galiltzin, Penna

44 MODELS, MODEL SUPPLIES

FHIP and other scale models Most complete line in New England, Kits, fittings, plans, books, tools, engines, motors, likustrated catalog 25c, James Bliss & Coinc. Dept. PS68, 342 Atlantic Ave., Boston 10. Mass

SHIP and yacht model fittings' blueprints. Send 33c for illustrated estalor =29 facing hundreds of items. A. J. Fisher 1062-2 Etowah Avs., Stoyal Oak, Michigan.

1974 CAR m deta 1 23 ora e ad metal ebrome tr m Sand for catalog Ca s & Hobbers Dept PS-30 2223 Maddon. Chicago

SEND for illustrated rathroad estator no and O Selley 746 Clay Winter Park.

OEARS and model Supplies for the inventors. Send 10c for entains. Pierce Model Works, Timley Park, Union.

FLEISCHMAN famous Corman Steam-Engines 53 55 to 545 00 de mechanical show for to 545 00 postpass. Catalog 35c. Merie Company, 50-10 54 Street. Elmhurst 73 New York.

POCKET and fubricator 1001 uses lonkproof perfect for precision ofling \$1.00 upd Wey Brothers, Quanah, Texas

BITAM cogines, boilers, tastings, Calaleg 25c Anton Bohaboy, 2307 Price, Rahway N J

BHIP Models Lid Kits, Fistings Plane, Stuart-Turner Steam Engine Castings 1954 Catalog 25c Box 225, Andover, Mass.

68 HOME CRAFTSMAN

"TOPS" in everything for Leathereraft. Lowest prices. Genuine "Craftooi" stamps Catalog 10c. Crown Leather Company, 22 Spruce Street, New York 32

LEATHER tools, lacing supplies. Free Catalog National Handstraft 199 William St. New York ?

"PRACTICAL Painting Wood Finishing of the bow to get professions, read at Furniture Salatary within a projects bowe decoral a Companie Modern brush and apray methoda Tricks you've never seets Write Home Craftaman. 115 F. Worth St. N. Y. 12

Plantics point eight course for Men and Wirest Tells and above his to make buildings of fact or its plantics products All plantics and majorials for 23 projects the steel in course. No special troop needed Course pair for time! Write his free his kiet Interstate Telling Service. Dept. 372 H. Portland 13 Gregon.

tratitaticmart Tremendous stock of seather tools, supplies and kits. In leather business over forty years, Send lite for hig catalog. Sax Bros. 1111 No. 3rd. Dept. PSS Milwaukee 3. Wisconsin

LEATHERCRAFT Metal Toolog Taxtie Paloling Benders t Shenerals . many other craits, Fun, easy profitable? Free, big illustrated on a Write laday Kit Kraft lept 350 Ross wood 46 Casil

PREE Do it Yourself Leuthercraft Catalog Tandy Leather Company Mon 781-85. Port Worth Takes

FREE! LeatherMraft Catalog Free! Write Box 297B (Use Little 2c postcard!) Tandy Leather Tulsa. Oblahoma

LEATHERS HAPT of Highest Quality for Advanced Hobbyists Professionals and Crafts Clausin. Careful gradum assures a sentential selection of too as and envising leathers fine as inkins him and projects. Quality Character tone supplies have Time by using UniOne matter at Ali your secheration of the second 10th Tone as preferall requirements. At orders at prediction day received Pend 10th Today for high New Lancated Careful Act News I Character Co. 228 & Tripp Dept 6354 Chicago 24

140 PTIL size patterns Betart new gifts never bes annit Caured of event actern fraudricus auct aneta Plus Make Money J.g Naming Ot y \$1.00 Manfercraft \$55 7041 Occult Chicago 31 L note

170 NFW full vice Jupant Patterna Unusua hovefries gifts have figures up to 12 thehea high action specty so-tound) window, town use ut gadgets Artist draws to Craftmans 1321 B South Market Chicago 5

RENGATIONAL new sinks sander hit 24 page battus ton assembly his k with protographs compare a see Seations detain \$1.00 A join Engineering But 191 Densitie 2 New Joines

STATECHAPT sure fire him 'Pretraced' leather E. to Hardbars B. Joids F agree Betts over first other provents Patterns on the her Why trace Just carve assemble and lace I age assemble hits also ave the Bend 25c for calanginess folder Refunded first order Apache Leather Company 2004 E. Washington St., Phoenix Arizona

Plant 24 page. Copper brass materials catalogue Oroundmaster Company Boulder Colorado

BUY wholesale nationally advertised power hand tools thousands after products at big discounts. Fire Whiterast Plan. American Buyers' 626-26 Linden Buffalo 16 New York

PORMICA Remnants make coffee & end tables sheaves cabinet tops Samples & price list 50c. Modern Wooderalt, 253 Broadway Bayonne, New Jersey

LAMP Bize cypress knee nipple installed \$2.00 Cy Products. Dept. 3M Lafayette La.

NOVELTY planters for pleasure profite Bix patterns instructions 30c P Brown 33 Hawthorne, Norwood, Mass

ENOCKDOWN Cedar Chest. Lumber and Veneers. Free Price List. Gales Co Brownsboro Asabama

KNOCKDOWN cedar chest and lumber free pilce hat Bedford Lumber Company Shelbyville Temperage

1 EATHERCRAFT Tools Leather Embossing Pietes Craft Accessories Dies Cata wue 10c Louis Jones Engineering Company 1612 Main. Fort Worth Texas

EQUAREKNOTTERS Make he is handbage intracted dog eaches etc Special offert Beginter's book case og and qually cord samples 15c P C Herwig Co Dept P4. 30 Henry St Brooklyn I New York EXOTIC Veneers for home craftemen. Veneering Tips price but free Veneers Box 1644 A Louisv & Kentucky

OF BUILD BY YOURSELF

INFI ATE bas come with higher than-air gas Enjoy fascination new hooby and unusual sport Build your own apparatus Send messages hundreds of miles Use for target practice Simple, low cost casy-to-build Diagrims formula complete instructions Send \$1 Central Machine Works, Dept. P.S. Bioux City Iowa

PROPIT from nature pana \$1 Naco. R-6 Bex 357, Pensacola Porida

OEICIER Counter and Metal Detector Kita, Inexpensiva, Educations, Pres I tgrature, Electronic Applications, Box 4975 Wastington & D. C.

\$1.00 PIPE vice send for information H A Johnson P.O. Box 62 Pruitvate Station Oakland California

CONCRETE Black Homen ' 37 page benklet on how to build \$1.00 M C Lightfoot Civil Engineer Richboro Pa.

ELECTRIC drait privers sixteen tuch rotary mover. Mit includes spind es heurings purieys blads flanges plans instructions \$16.40 postpaid Parwest Fabricators, Box 465 Brynmawr Beattle 56, Washington.

MACHINIST Tool and Diemakers make your own Patented Vise Jockey Complete 4 drawings \$3.00 enclose self addressed labe. Vise Jockey 361 - Plat Street Broaklyn 9 New York

Build permanent awnings paties julousis porch bathtub and shower enclosures Aluminum prefabricated frames Assemble yourself and save Close-out prices Russ Smith 1565 Ridgewood, Cleve and 7 Obio

DRIFTWOOD Lamp Mits, complete with driftwood brass tabing wiring fixtures to 95. No COD, Driftwood, Box 2361, Kennore 21 New York

POWER Mower Kits, free plans, instructions, parts list Temos Mowers, Springfield J. Missouri

CLEVENGER 5 cold bending ornamental railing furniture instructions \$2.00. Weld or rivet. Box 1001 Santa Ross. California.

AlR Conditioners Home of Automobile See See ey ad page 54

CUSTOM desks table tops Wrought from Legs any length factory prices. Rapoo Mig 1124 Westward Bird Phosnix Artsona

WHOLESALE plumbing heating supplies free catalog Aim. 216 South St. Philadelphia 41 Pa

RANCH House, 3 bed rooms, Architecturally drugged Plans and specifications \$2.00 Roth Tech Box 2283-P, Youngstown Obto

50 TOY Plans 50c Original Idea Easily built using household items 50 Mascorry, 1039 Waverly Ban Antonio. Texas

BAROMETERS build own-free information, Abtek, 1975 Third Avenue, New York 21.

47 OLD GOLD, ZEWELRY, WATCHES, ETC.

JEWELRY making Send 20c for illustrated catalog Milady-Fair Co., O.P.O. 1328, New York City 1.

RHINESTONES Jewelry Settings Camcon Sequins Beads Hubby Kits Send for for Illustrated Ca alog J & M Novelties Dept. CJ 4 Orifith Indiana

PREE Sample pair of Earrings shows you how easy it is to make beautiful containe jewelry. Over 5000 styles insted in New Catalog. 25c. Barry s. 178 Ardsley Court. Newsk. New Jersey.

17 JEWEL Swiss watches \$14.95 Phis 10 . tax Men's thuck resistant water restitant and magnetic incadioc stain ess expansion hand Ladies gold plated watch and expansion hand Satisfaction No C O D General Saics 1420 Haulton Motophis 11 Tennessee

RIGHEST Cash For Old Gold Broken Jewery Gold Teeth Watches Diamonds Streeware Spectates Plat num Free inin mation 5a staction Quaranteed Rose Refers Research Bridg Chicago 1

SWISS watches \$18.00 catalog 10c Berkowitz 1150 Caatlebili New York 42

COSTOME Jewelry. Findings Stones.
Rhudium and Hamilton plating Rose Supply 854 South Orange Avenue Newark
New Jersey

TOBACCO & PIPEN

PIPE Smokers' Cinar Smokers' Pres illustrated cutaing offers Jube his autings on choice imported and domestic pries cigars tobaccus supplies Write Waity Prack Dept 2 356 Nassau Street New York 32 N Y

FOR THE HOME

Cl.EAN your coal furnace with hinged radiator rate \$2.00 postpaid Midwest Products Box 223 Putate/10 Idaho

(HARANTEED formula cicana cesapools ospite tanks Details Irse Reyco Box 666 Council Bluffs lowe

NFW ' Electronic Brain automatically defronts refrigerators turns off and on the resisions fudion tonaters house lights, etc. Anytime of the right or day \$6.05 - free information W sams Electronics, inc. Box 466 Dept 20 Newark 1 N J

CERSPOOLS septic tanks outdoor tourts cleaned deadurized. No pumping, diging or moving necessary Inexpensive, Details Chemical Changon Cleaning Co., Boston 34 Mass

PAMOUS colored art reproductions. Bargains Pres hal Horizon 230 Milh Street Paterson New Jersey

FOAM rubber furn ture cushions Factory seconds 56 . discount Free catalog Fs ma-Foam 140 A Main Street, East O. a. ge New Jursey

10 OF INTEREST TO WOMEN

ADDRESS Advertising Postcards Must have good handwriting Box Nine Water-town Mass

EMBROIDFR Stamped Lineus Buy difact from manufacturer and save. Send for Free cata of Merribee Dept. 508, 23 West Sist Street New York 10 N. T.

NEW Plastic Scending Tape, Just press on' Repairs clothing instantly Lights he seller Samples sent on trial Kristee 103 Akron Onio

MAKE money addressing envelopes sparetime Grenway \$113 Euclid. Cleve-land 3 Ohio

DRESHES Me shoes Me men a suita 84 93 trousers \$1 30 Better used ciothicar Pree Cat Transworld, 184 AP Christopher Brooklyn 12, New York

NEW starting Besame System strange numerological device predicts coming events with amusing accuracy Analyses character Mystery sticks emerge at your command with winning numbers sports events Pascinating uncanny Keys Box 3852 Portland & Oregon \$2.56 postpaid

A Dress-largerie shop in your home. No investment Good commissions Write for Sample Book Modern Manner 366-PC Pilth Avenue New York

HOME Business opportunity mailing literature to new mothern Everything furnamed Bug sarnings K t instructions, \$1.00 Stanwill Company Postures 44 Ohio.

GROW Mushrooms. Cellar shed and outdoors. Spare full time, year round. We pay \$3.50 fb. We paid Subbitt \$4.163.00 in few weeks. Free Book, Washington Mushroom Ind., Dept. 181, 2954 Admiral Way, particle.

11 FOR SALE MISCELLANEOUS

CHILD'S handbag, compact, lipstick, comb—\$1.00; Play moneyhit—50c Prepaid. Rate's, Box 1400 Long Brach Carll

CATALOG on government surplus from country's largest surplus organization aptending in outdoor sporting goods clothing camping equipment Hundreds of items including tents rubber boats tarpeuting, swim fins. Only 10c; Rocksway, Sales Co. Dept. Pf. Route 46. Rocksway, New Jersey

72 WANTED MISCELLANEOUS

SCRAP Mercury (Quickaliver) tontailer a supplied, Tantalum-Bismuthfuguren Me andreical Products Co.-Established 1909 15th & Moore Streets Padembia 45 Pa

LIGHT meter Commander wanted Manufactured by Kemp Esenberg B Paul Reeves Instrument Corp 2)5 E Sist. New York 28

QUICKSILVER, Platinum, Silver, Diamonds, Frompt Payment, Mercury Terminal, Norwood, Massachusetts

3 WEARING APPAREL

Ties matching onks \$1.00 set Prepaid Solids paterns state cour Sistes Box 1809 Long Beach Cautornia

WORK clothes below wholesals cost Quality cotton pants and shop costs \$1.65 all cottes reconditioned stern red We will ship shywhere COD Write Eastern Processing Co. Buz C. Frankrin Station Saltimore 23 Md.

INTRODUCTORY Offer Boxer Shorts sizes 66 to 60 f. 00 Liberrated furnishings clothing work cluthes catalog in cluded. His Elein's Fat Men's Shop 50 E Third Avenue New York I New York

15 TATTOOING BIPPLIES

TATTOOING Course and Supply Brochures, 25c. 2ets School, 720 Leeley Rockford, Hidnon

TREASURE PINDERS

TREASURE Hunters! New 11-pound featherweight Model 101 locator for guid eliver and minerals. Money-back guarantee best available. Also Deigar Counters for uranium prospectors. Complete information free. The Goldak Company 1349 W Calentake Band Garridale 1 Calif.

OOLD, Silver, Metal Detectors, Geiger Counters for Uranium Mineralishia, Sensational new fully guaranteed models. More Piner Information Free, Detection Corp. 5430 Vineland Ave., North Hollywood, California.

BELYCTIVE motal and mineral detector Revolutionary design D stanguishes, metals from black magnetic saids Readity detects merals under said water Also General unters Free Attracture Curds or Electronics Company 2018 N Dayton Phoenix Arizona

URANJUM, Gold. Silver Treasure. New Power-packed highly sensitive metal detectors and Geiger Counters. Kit and factory assembled models from \$34.50 1 ightest weight guaranteed Five Literature Electronic Applications. Box 4575 Washington 5 D C.

TREABURE—M Scope Origer Counters

Mineral Locators Why buy something
inferior when you can buy the best at a
lower price' Backed by years of experience Pully guaranteed by factory Detects
inferent metals god silver coins Payment plan available Proven superior performance. From 16 page illustrated Socklet
Flaher Research Lab. Inc. Palo Aito. Calif

78 WATCH REPAIRING

WATCH and clock repairing books for hobbylists. Free information North American, Dept. 34-R. 2130 N Milwaukee, Chicago 47, Elitois

WATCH Repairing—Modernized Correspondence Course. Free information WatcHealing Institute, Box 34715-B, Los Angeles 14.

WATCHMAKERS' Tools Materials Supplies Watches Catalog Gales, Box 1000 Chicago 90. Hilings

WATCHMAKERS) Beginners! Watches Movements. Descriptive list. Box 180 Chicago 90 In hots

MISCELLANEOUS

ADDRESS Advertising Postcards, Must have good bandwriting. Box Nine, Water-town Mass.

LIST your name in "Big Mails." Get many offers. 25c Cash Refundable Walter Ris, Box 6521-B. Carveland 1, Ohio. GET the Opportunity Packet for the latest and best money-making offers in mallorder Everything for 25c Redmon. Capital Heights 2 Maryland.

SWAP unwanted articles for neeful ones Send your name, address and names of articles you wish to swap plus \$1.00 for list of articles and people wanting to swap Your name added to list free. Tradex. Box 626. Jacksborn Texas

BUY Wholesale thousands nationally "Wholesale Piph," American Buyers' 431-E Linden Buffalo New York

RECEIVE Magazines, samples cats-ingues, Mails from everywhere Offers hundreds. Gs. 1 sted 25c Rorick Box 88-M Carembati 28 Obio

BiG interesting mails three months 35c. year \$1 00. Harvey Teeple, Decatur, Ind.

MAILORDER directory of malting list sources for \$3.00. Huber Enterprises. 123 Harris Place, Spartanburg, So. Carolina

1001 HOURS of Pun, 25c. Games tricks Puzzles, Sanford Sales Co., 170 Broadway New York 38, New York

EYEGLASS forging prevented perma-hently One wipe with amazing chemical cloth, Free details, LoPresty, RD2 Wharton New Jerkey

SEPTIC tanks outdoor todets recondtioned, deodorized without dar on pump-ing Easy guaranteed do-it-yourself method Free Write Orapite State Indus-tries Box 507E. Manchester M. H.

OROW Mushrooms. Cellar, shed and outdoors. Spare full time year round. We pay \$3.50 ib. We paid Babbitt \$4.165.50 in few weeks. Proc Book. Washington Mushroom Ind., Dept. 183, 2634 Admiral Way, Seattle, Washington.

PERSONAL

DETECTIVE'S Opportunities. Detective particulars free, Write, Wagoner P-125 West 35th, New York 24

HOW Can I Find Out" You Can' Information confidentially developed Any matter person problem World wide Of-ficially licensed. Established 1922. William Herman 170 Broadway, New York.

RUPTURED' Light Cool No leg straps. No clastic No Worn by Mechanics Parmers Doctors, etc everywhere Gustanteed, Write Hand-Lock Products. Dept P S. Preston. Ont.

INCREDIBLE: Become Mental Superman Overnish ! Free Booklet! Bijos, Box 1727 VO. Hollywood 28. California.

ADDRESS Advertising Postcards Must have good handwriting. Box Nine, Water-LOWIS MILES

POOL your friends 6 postcards mailed 61 00. Letters remailed 25c from beautiful Newport, Rhode Island, H. M. Dorey Malting Service 12 Arnold Ave Newport, TOTAL CONTRACTOR

PSORIASIS Victims Hopeless' New Discovery! Free Trial offer, Write Pixsool. Box 3543-8. Cieveland Ohio

HAND Guide. Corrects your Penmanship in 16 hours. Write Perfect Penmanship. B. c. 605 saP St. Louis Missoury.

SAN Diego California Letter remailed 25c 5 beautiful postals \$1.00 remailed Sunday classifieds airmailed \$1 00 Traveler a private address service \$5.00 Advertisement reputes received forwarded 120 00 month Projects pererty owners, etc. Confidential Services

WHAT is your "I.Q "? If you read English you can now take an excellent recogpized general intel-gence test for adults in your own home. Very low cost! Por free information, write University Test Bureau PO Box 401 Palo Alto, California

PLORIDA Jacksonville - Letters re-mailed 25c. Beach postcards 3-61.06. R. Henry, 2257 Riverside, Apt. 33.

BACKACHE? Try these simple exercises at home for relief Send \$1 00 to O C. Company P O. Box 17. North Station, White Plains New York

INTERESTING Mails 25c keeps your man, box full three months. Bentz Desk-J 97 Chatawa Mussissippi

"X-RAY Mind." Dangerous power over others. (Details-19c) Krishnar Institute. Box \$12-86. Escondido, Calif

INVESTIGATOR Training. Experience unnecessary Many opportunities, Send for Pres particulars. Pres credentials, Exchange Secret Service System, 4360 Broad-Way Chicago 12 Illinois.

BUY vitamins direct. Amazing savings. Cataing free, Matoska. White Bear Luke. Minn

GERMAN Address hats' Anything manufactured 50c Burke Associates Manchester 2 Mass.

NEW Passe Plate for Old in 24 hours Low as only \$15 95; Enjoy comfortable attractive false teeth, Made of Justrous Dupont Beauty Pink Plastic Allianing Savings Free Details West Gunnel Laboratory Dept 500 127 N Dearborn Chicago 2 Illinois

SFKD Postentie from Seattle. We will send you five high-grade pards showing scenes in Seattle. You address and write message, return to us and we mail, We pay ad postage guarantee satisfaction \$1.00 Crosbey Mailing Bervice 19801 Ma-rine View Drive. Benitle 64 Wannington,

LETTERS remailed in Oregon 25c. Hobby Shop Box 418 Williams & Orrgon. JOIN Money Getters Club 25c R Storm -- Associates Cedarville New Jersey

MEXICAN Law General Practice Attor-tier 1203 Arizona Street El Paso Texas.

LETTERS Remailed from any City to the United States of Canada, one-25c, ave \$1.00 state city and maining date desired Autoci Box 25 Rothbury Michigan. CHRIST returned 70 A.D. Free litera-

ture, Truth, 31 Lexington, Phoenix, Arix.

24" ATTIC FAN



Easy to assemble thele determ. None shaft I self al going beat-ings. 2 pulleys, I collars and V-belt Everything you need except

frame and \$1-lip, motor, to make your on the content of the party save \$46.00

PENNA WHOLESALE DISTRIBUTORS 102 M. 4th Sr., Phile. 6, Pa.

See the Greatest Shew on Earth with this



FREE

Catalogi

Doderwater

Witness Training

enu binent Write may'

Definitely to be for an ICan 198 75% piles promote active data of promote active data of promote despite the promote of the period of the peri od 201 V and 100% propleces sustingle at \$2.01 or SUFFOLK SCIENCE SERVICE

DEPT, ATP-8

ASSEMBLE YOUR OWN DIVING LUNG

Single Tank Fig \$39.9 Double Tank Rig .. \$49.95

Absolutely nothing class to buy! We furnish the parts plus complete instructions show I'm les ed optional changes you can easily

make Outh's include Mask Harness Blose, Tank for Tanks Regulator and Fillings

Write for descriptive literature today! EDW. AGUADO TROG. CO., Dept. M4,

F.O. Reg 4525 Pleza Station, St. Louis, Ma.

BENJAMIN SUPER CO2GAS CARBINE-\$16.50 NEWEST TARGET \$1516-32 ECONOMICAL POTAL EAFE-NON TOXIC ACCURATE-CONVENIENT POE PRACTICAL Easy to operate-No spring MALL recoll - No pumping. Uses low cost Soda Cartridges Cal. 21 Bosjanciu H-C Pellote and Darte. Senjemia CO2 Gas Pistols

PENJAMIN ALD DIFFES AND BENJAMIN AIR PETPOLS MARION ST., ST. LOUIS 4, MO. U.S.A.



ELECTRIC MASSAGES

Professional-Type

 4 Scient-Really Designed Applicators

Also Aveileble

Sonitory

A few minutes dolly wse of VIBROSAGE gives that stimulatleg, kealthful old to circulation . . . retief from aches and pains, Four applicators assure maximum offec-

tiveness for scalp, foce and body. Operates on 110 volt, 60 cycle A.C. Five day Irial money-back avaranteel If your dealer connot supply you, send \$8.50 check or manny order for prepaid shipment. Or, send \$2) pay postman balance

plus postage and C.O.D. charges. BEAUTY APPLIANCE CORP., Dept. V534-H RACINE, WIS.





Everything You Need to Make Big Maney With New "Midget Miracle" PRESTO Over 2 MILLION Already Sold!

PREE everything you need to cash in on this

Advertised IN LIFE Magaziat

A MONTH

print a few kind of fire as logalisher. Tiny

Preso tables the size of a
flast whit does job of builty ex

biguishers that cost 4 temes as
to tell fire fait as 2 seconds bits
in print of hand leave currents. Guaranteed for .0 years' A tremen. dots mores making bargates sails for unly \$3 68!

for anly \$3.98!

On to be differ you get complete.
Sales but Fight Riverthing you devid to wron the first and to clay the enter workers awners of homes. It is best a same boats for re as a make big in and I haven't better for the C. M. Hours made \$175 in looked better that 5 days. M. It State by 8 tor a well on the E. Sales by No risk No oblight on tif you want a frequent Prevo to have As a demonstrator, and only \$2.51 Member back if you wash.)



OVER \$1,000

MERLITE INDUSTRIES.

Dept. 110, 114 East 32ml St., New York 16, N. Y.



WITE-WALL LIVE RUBBER DISCS

+ (K |) | K |) -14 Marie Tra 4/20 VL T . 116 For the appendix of the second of the second

AMERICAN WITE WALL RUBBER DISC CO 8310 Levernois, Detroit 4, Michigan



A-12 DIMAND OXYGEN REGULATOR



Flutter Valves 40 and 50 Mouth Press. 45 Hose, 2 Ft ... 40 4 Ft, 63 Cylinder 24x3% %" spening. \$2.50 Cylinder 18: xx3% %" spening \$2.00 \$3 00 Top Fitting. **35 De** Clamps

USED GOVERNMENT SURPLUS

Terms shock or 50% deposit and belance C.O.D.

M. A. NORDEN SUPPLY COMPANY 273 M. Washington Ave.

BE *FREE* FROM TRUSS SLAVERY

NOW there is a new modern Non-Surgical treatment that permanently corrects rupture. These Non-Surgleaf treatments are so certain, that a Lifetune Certificate of Assurance is given. Write today for our New FREE Book that gives facts that may cave you painful and expensive surgery, and tells how non-surgically you may again work, live, play and love and en-joy life in the manner you desire. There is no obligation Exceluse Hernin Clinic Dept. 3705 — Exceluse Springs. Ma.

BUILD YOUR OWN

AIR CONDITIONERS

AND DEHUMIDIFIERS-FOR HOME OR AUTOMOBILE FROM JUNKED REFRIGERATORS-FOR \$15 lestruction books O for Rome 73c of for Car - 75r Both for \$1.00 (OMPLETE "lestell-H-Youngle" KiT for Auto — ONLY \$164.70 For all contains exercising you need to instal an air conditioner to your car that is exactly on a jacky and performance of price eather should be more than to capacity and performance of price eather should be more than the bundleds of do are. Send for instruct on both for further information to

SEELEY PRODUCTS CO., Dopt. 818, 3716 Belmont, Chicago 18, IN.

LICEURA TREE DAGO OFFICER SAME AS LIRED PROFESSION RANGE, OFCIPPE BASID AND CONFECE ACTUATOR ALL S

A MADO CAMBGUE TE MACHINE PRINCE STORES MANUAL COMPONE CONTARE TO PLANT \$3.56

BOATE CARS

0.44.00 COMPO. RADIOMOGES BOX 36 DEPT, PS BASTIMORE 6, MARYLAND



TOU BET 2 FOR \$1 00 POSTPAID That. It convey could's MOVELTY MEARY 59 E 6th Street New York 3 NY, Dept 276



F.O. SOE 246- E-8 WARREN, OHIO

name, froe literature.

DRIVER'S AID . . . the LOOK-OUT

At last, PERFECT side and rear vision! The LOOK OCT is an amazing unlety mirror de-signed to eleminate those dangarous blind spets —a yee complete 180 vision on both rides for FULL view of the rand A "most" for travelers, vacations in for EVERY our Fits any salestor reserved installation enty — se tools needed Order new—tearry no C O D se—easy \$2.55 ppd

THE BO-DIX CO.

7119 CLYDE AV.

CHICAGO 49, ILL.

Learn Short-Cut Mathematics plus is post so your marks in parties from Make p it street by mas (b) a) material a

Sharpen up Your Brain Power

Parts of a decided to peroperate are seen as a contract of the appearance of the app

NELSON-HALL CO., 710 E. Clotes St. Orpt 2HW-1 Chicago 6. Ulf.

\$2.95 EACH OR 2 FOR \$5.00!

Genain Temphone Company Upright Tex phone complete with cords in texted and guidant of condition with 50 ft of was real of tape inter-communication in-all actions. Tape and wire offer for this month only. Compare size of the phones. traknete intera-minustration ele-Write for free list. All shipments F O B.

TELEPHONE ENGINEERING CO. Simpson, Pa. Dupt, SA4

GIANT 100 POWER DAY & NIGHT

TELESCOPE

Steel and brass tubing construction Ready to use Two exerces Instructions for use as a belioscope Extra beavy tripod \$7.00 fob factors

400X telescope makers lens kit has brass focus og tube erector 5 jenses and instructions \$7.00 postpaid

CARL W. JAMER, Dept. 55, MANORVILLE, N.Y.

SLINGSHOT

SILENT-RIFLE FAST+ POWERFUL+ACCURATE

formers for attents which is said cate of almost the AS partitle out to the arms of the partition of the par

SOCK-O Box 111, So. San Gabriel, Calif.



· Assemble your

own boot · No experience • Prices include

· Save : to 1/3 "factory built" prices

necessary freight and paint 8 to 14' Models from \$39.25 Trollers, Fiberglas, Morine Hardware

Maine Division 3207 FEEMONT AVE. SO. INDUSTRIES MINNEAPOLIS 8, MINN.

This is it!-AMAZING FOUNTAIN BRUSH washes your car 9 minutes!

\$3.00 Direct trom Factory to you!

Generous supply of powerful, yet gentle AEROMAT detergent, manufactured by makers of famed UN disortectants— GIVEN: Removes road film Never mass finish never strenks! Parkage holds enough for 24 car washes—gives you 324 or more in washes!

- Built-in Suds Chamber
- Saft-as-Silk Bristles
- 3-ft. Handle Keeps You Dry
- Rubber Bumper Protects Car
- Rotary Hi-Pressure Action!

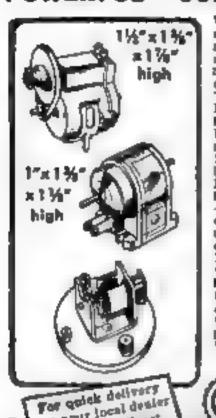
Thousan is sold at much higher prices' Get AEROMAT WASHER to your gorden cose Pince special detergent in built in Su s Chamber and wash car sparking clear in 9 MINI TES FLAT! 3-foot long light metal han lie keeps you free & clear ROTARY HI-PRESSIBE action cosers removes all rout film & firt Also does lozens of this are in the house FAST' Special balls in valve to turn water on & off Saves time money and arm strain too Get yours NOW! SAVE postage by sending check cash or m.o with order Satisfaction guarant for money touck after 5 Day Trus. (Please add 22c) postage west of Miss . Send TODAY! It's a terrine value!

MOTO-MATIC

Dept. 7-14-444, 352 Fourth Ave., New York 10, N. Y.

(In Canada, etc add | 50 extra. Order dured from Thorses Co Geat. 2 is 444, 45 St. James St. W Meetres! I. P Q)

"TINY ATOM" ELECTRIC MOTORS POWERFUL -- COMPACT -- PRACTICAL



Wilson's dry-cell operated motors are "tope"-in design, cturdy construction, electrical characteristics and power Thousands in use by model builders, experimenters, model railroaders and to industry Three lested stylesstyles—every one

Model 8002: Metal cased, reversible Almos-field motor with built-in speed reducer Pulleys for 4000 and 1000 RPM Mounting bracket and belt supplied For 2-412 6 volts. Price \$3.00

Model 3100 Tiny Atom" motor -- speeds up to 8000 RPM Double extended shaft Permanent Aluico-Y magnet field wound rotor Heavy

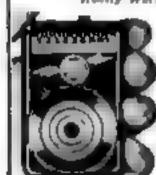
duty transparent plastic case. Por 115-3 volta, price \$2.00. For higher voltages, price \$2.50

Meter Mit No. 90-Sturdy steel (rame 3-4 volt mater Permanent Aintee V magnet, ball-bearings Reversible and fast-cooling in clear plastic box with 2 pluious, sear worm and pulley. Price \$4.08.

Remit with order and we put postage in U.S.A. No. U.O.D. Add 2% Sales Var for delinery to Ohio. Write Dept. PR see your local dealer

WILSON'S OF ELEVELAND 425 Lukasida Ave., N.W. . Cleveland 13, Okia

POCKET AMAZING NEW RADIO SIZE Really Works-



PRINTS ANY POCKET ON PURBE-ONTS NOT THE SWITT FOR THE PORTS

NOT THESE. BATTERIES OR COMPLIATION OF THE PROBLES IN ACT PLUG INST NOTE
ING TO WERE BUT. Thousands of query—many report years of service Lass new crysts, did note and HI Q coll BELF-CUNTATEND SPEAK BUT PHINE Just the Hipy radio to take with you ANYWIERE TOU OO—ON THIRS VISIT ING, BTC - (or eval fun and enjoyment—ANTTIME SEND ONLY \$1.00

(bits, th., mo.) and cay pustman 13 00

(bill, sk, me.) and car purimes #3 99 C D D. ce or send \$1.90 for c. de-MIDWAT CO. Dept PFS S Resembly, Welle



QUALITY BOAT KITS

WRITE FOR FREE LITERATURE

PURPLY MODDENHAL INDUSTRIES

1301-09 Otlawa Ave., Dept. 8-P Defiance, Ohio

Shrinks Hemorrhoids Without Surgery

Science Finds Healing Substance That Relieves Pain-Shrinks Hemorrhoids

Science has found a healing substance that shrinks hemorrhoids, stops pain promptly, ends bleeding - without surgery. Doctors report actual shrinking of hemorrhoids. Sufferers say, "Hemorrhoids have ceased to be a problem." The secret is Bio-Dyne® - already widely used for healing injured tissue. This substance is now available in a hemorrhoid ountment called Preparation H*. Ask your druggist for Preparation H. Money back guarantee. "Trade Mark



ONDERWATER SAFETY 1 are 6 with a medical a minute on e construction of the constructio DIVERS Supply CO., 1150 Welmington Berd, Welmington, Calif.

-MILLER Knee Action BOAT TRAILERS and BOAT TRAILER KITS 300 to 1800 LBS, CAPACITIES \$74.50

& Up, Tax Inc. ACCESSORIES, TOO.

QUALITY proved by MILLIONS OF MILES. Sold on MONEY-BACK GUARANTER, SHIPPED ALL OVER

THE WORLD. Write for folders and prices. MILLER COACH CO. P. D. BOX PS TIR

BIG NEW "MAKE-IT-YOURSELF" Furniture Book

* Saves You BIG Money!

with "How To Build and Repair Your Own Furniture" you'll be able to make sturdy, handsome furniture for every room in your home, at a fraction of what you'd pay in stores! You get 256 pages, 759 illustrations, 163 easy-to-do plans!

You Don't Have to Be an Expert!

Step-by-step directions, hundreds of simplified plans and photos take the guesswork out of every job and show you how to turn out professional-looking furniture on your first try! You'll learn how to make or repair tables, chairs, bookcases, desks, bedroom sets, built-in cabinets, shelves, two-way lamps, much more! PLUS useful type on mirrors, glass table tops, kitchen appliances, picture frames, rugs, etc.

7-Day Free Triall

Order your copy of this home owner's "dream book" now for ? days' FREE trial! On delivery pay postman only \$2.49 plus postage—then use it for a whole week at our risk. If not delighted return for full refund?

POPULAR SCIENCE, Dept. 854

353 Fourth Ave.

N. Y. 10, N. Y.



upon with speed driver, pilote Heavy daig, rasi resistant. Adjustable lawrens direct ntr. Pewerful typhy. 115-r AC sheded pole mater, Bullioned have Blacky blackeds and There, Clay-free strip trough. Adjustable side panels for news, easy window-fit, firest metering refer, leggle rerich, pipe manaellen, 25' tobing Sand \$5.00 m.s. or charle bulants C.O.S. plus shipping. Pay Infl amount; nove phipping units. Napply Stated - ACT HQW/



WEATHER MERCHANTS 2913-8 Section Ave. Delles 4, Texas

MOTOR SURRANTEED FOR ONE YEAR



Queen Victoria

Assemble this beautiful wrought from fountain, which brings new distinction to lawns and gardens Water cascades over first cup and falls into base. Motor re-pumps for continued use. Needs no plumbing, fill with garden hase once and you have a continuous water fail that cools a

large area around it. Height 51" bottom base 74" in dia. Available in standard colors Price complete with motor and 460

gailon-per-hour pump. \$249 50 FOB Philade phia, Pa Send for descriptive circular, which includes other desaitful prought tron lawn accessories. Dealer in-

MADSEN MACHINE & FOUNDBY WORKS Cornwolls Hg'ts., Pa.

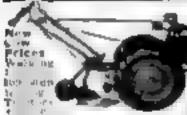
URANI

quiries intellem

GEIGER COUNTERS

for radioactivity detection and uranium prosperting. All module and sizes available-from low-cost extra-sensitive, portable detestors to super-sensitive, long range models suitable for eirborne or mobile prespecting. FREE INFORMATION.

THE DETECTION CORP. Dept. PS-12 Morth Hallywood, Collf. \$430 Vineland Ave.



Improved design, better value h, 12 212, 2 5 H P warrent, tructors New, law cout, tructors New, law cout, pitramines and inexpensive, riding fractor inexpensive, and the pulverifies in the little that pulverifies in the little that pulverifies in the little very new tools and live and little very THE

SHAW MFG. CO. 8700 Front St., Galeaburg, Ramb.



FINE BOWS and ARROWS BELEGTED BAW MATEMALS

Catalog 50 send for R

HAND BOOK-Illustrated Instructions on Making and Sheeting Archery Tasklo-784

L. E. STEMMLER CO. Monorville (Bex 1) L. I. N. Y.



EASY to EARN EXTRA MONEY

You can do it this pleasant sparetime way right in your own home, Cash paid daily. No experience noceasary. Write to

NAT'L, ENG., Box 21, Welerlown, Mass.

60 POWER TELESCOPE

\$3.98

Most preserful for any where

NEW! Three te escupes in one 3 d forest magnifications 30 power for a) tra-br ght images with a 1 and 0 s power to thing defent oh this peo-ple sports events all ps. Guaranteed Dates Made in U # A.

P= 0 4 ground and polished ful compound microscope by requires to the total and compound of the product of the product of the price of \$1 P8 complete Money

back guarantee. We hay postage Get yours now

An A Microscope

CRITERION CO. DEPT. PSB23

331 CHURCH ST. HARTFORD I, CONN.

pour the mesey

AUGUST 1954 57

wa your own business! earn up to CLEAR! PROFIT or basement vord

BLOCKS With Amazing New GENERAL BLOCK MACHINE

NOW! Big Building Boom Profits Within Your Reach You den't need much such to each in on the building boom! New fright speed, low cost General Block Machine greduces up to 1 000 concrete blocks a day for homes factories, buildings, garages Your profit markus is 100% to 150% | Fool proof, nasily operated, sturgy size) machine can make any size icom 4" to 12". Those superior 3 core blocks meet all building code requirements for loundation, chimney, corner, such and many other types of blocks. Works

todoors or nut. Sand cement and water avail sale anywhere! Simple operating instructions and mising formulae for toment and einder blocks suspiled FREE Get full dutells, na estigution'

EXTRA!

Amurice Blustrated book gives floor plant for & sensational congrete biock hungalows. Tells how to tay blocks, lay out build ; lag lines, mix renerate build stops, perch and concrete floors alt at coun and great sevings. Written by unpecto Can sava many times the cost of the machine! Get it new! Me strings attached



GENERAL INGINES COMPANY

وموادرة المراوا

307 HUNTER STREET. GLOUCESTER, N. J.

POCKET

LIFELIKE-SHOOTS BLANKS NO POLICE PERMIT NEEDED

trade the remain quality power platel for a son mandated of a guest you steel to rise tolerances by Corman guests. The Han a short magnifest in any description and fully surposed to be a section and thirty derivates. It a we never enter the last the bare ordered and events the province the province to the pr



If you buy machinal

UNITED ARMS, 9043 S. Western, Dent KP-401 Chicago 20



SURPLUS STOCK FROM MIDWEST SUPPLY FIRM! Terrific values you've not to see to believe!

Made to sell for 2 99: New Only

What a buy' 4 for the price of one! These shirts, though weed, are washed, stanked and ready for long, tough weer. In blue or tan, Sand same, address, sack size.

PANTS to match

Sold for 1 85 now only Unbelievable Bargains: Soud weist measure and inside log length.

COVERALLS . weer 'em used and save plenty! Originally 5.55. New only Speci chest recoverement

SATISFACTION QUARANTEED! Your money back if you can best those bergains anywhere! You can't lose so order TODAY for immediate delivery! Pay postman or send money with your order and save postage. \$1.00 deposit on G.O.D. orders.

GALCO SALES CO. Dept. 248

7120 Hervard Ave. • Cleveland 5, Ohio



Model Toys will give your youngster valuable instruction as well as many hours of summertime fue. Constructed of heavy gange steel, they entiret other toys 3 to 1

> Englid Truck - \$11.95 Backet Lander-3-1 95

Wast 1 d TS Wust 5 9 13

Par PRES CATALOG wells to

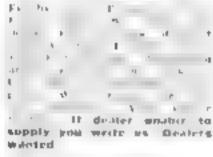


"LOOK, DAD! ONE HAND"

America's Only Rigid-Tex Double Strength Aluminum Boot



Weighs Only 39 POUNDS



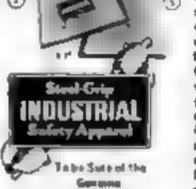
Via Holda Mfg. Co. Topeka 20 Man.



USE THE NATION'S No. 1

You will be convinced

These gloves are made from (I) finest prades of chrome split leather (also made in one-finger and (ul) millen styles). (2) The back is cut in one piece uliminating seams on back of hand which been through and rip when exposed to heat, (i) Wool heat breaker stricked incide back prevides seed insulation against heat during eather life of glove Seems are waited for extra strength at all paints of greatest weer. 6 Thumb seam full-welled. Use STEEL-GAIP quality.



tond This Trade Mark INDUSTRIAL GLOVES COMPANY

a corporation 1425 Garifold Street, Conville, Hilbert (In Conoca, Solety Supply Co., Toronto)



GIANT BALLOONS

Sur los 1 N Guy't, New Overage) MEOPREME West or target had soon, to r fun or fabric, Great spect to the bockgare of fire all a picales dance for a MONEY MANEES, I -v liber to be leaded to attract frowed to els e exents rome: lons extront ne trade shows. TE thirts for Light school. an college PROMS, All above are approx (pringed also Postage paid on prepald orders

3 ft die 49e-4 ft, die, 89e 18 ft die, \$4.60-26 ft die, \$5.08

WAR ASSETS DIV. VOLUME SALES CO. Sept. S-8-84, 3936 Sumist Wind, Lap Angelon 29, Calif.



NEW1 GEIGER COUNTER WITH

a tilgh consitivity proba.

· Balli-in Battury checker.

· Low-price long-life batteries.

Write for details. Dealer tegnirles invited.

TECHNICAL ASSOCIATES DEPL 188

tas W. Providencia Aug. - Burbant, Calit,



the state of the s from simple st p :

BUSSE SALES CO., Hartford, Conn., Dept. P\$24



HOTELS STO

ATTIC EXHAUST

28 COMPLETE WITH 1/4 HP MOTOR A.G. 110V STEEL FRAME-TOR-BLADE GUARANTEED 5 Yes, Name Rated 8050 C.F.M. EASY TO INSTALL & ASSEMBLE For Unt in STORES

lf you cannot visit us send for Fan Parts and Electric Motor Catalogue

Albin Machine Co. Send Check or Money Order. C O D. send \$5 deposit.

FACTORIES, etc.

425 W Jefferson Ave., Detroit 26, Mich. 1529 Vine St., Cincinnati 16, Ofice

NEW LIFE GUARANTEED FOR OLD TY PICTURE TUBES!



BOOSTUBE SAVES TY PICTURE TUBES!

Save up to \$40 over new picture tube cost! Week, washed out, finding pictures from old, long-used tubes become light, bright, sharp — for up to six months — many times longer! Amazing new BOOSTI BE, secret of professional service men, gives them new life! Anyone can install — no wiring needed! Absolutely Guaranteed to please, or purchase price refunded! State TV make, picture size, model number if possible, Send \$4.95 TODAY for postpaid BOOSTUBE and instructions. Satisfaction completely GUARANTEED!

ALLIED, INC., DEPT. B

2503 N. 3RD ST. . MILWAUKEE 12, WISCONSIN

TELEPHONES



Desk Stand Style Slightly used but in excellent condition

Inter-Hause Photos Hause to Barn, etc. Laud Spenkers M crophones Educational Purposes, Toys, etc.

n the warmer diagrams included. \$2.75 Postpaid in U.S.A.

TELEPHONE LAMP KIT with til stented instruc-\$6.50 Ppd (Stude to not Incorded)

MICROPHONE, Dapt. X-1384, 1766 W. Lunt Ave., Chesgo 26, 18.

BLOOD PRESSURE GAUGE



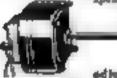
For Home two New Year and check your pate and an early to the world and early to the way to contain the related Meet 3 to have been been and the related Meet 3 to have been been to the world to the world or reduce the damped of the pate of the standard or reduce the damped of the pate of the standard or reduce the damped of the standard or reduce the standard or the standard

OF THE DESIGNATION MY SPECIALTY COMPANY Scientific Instrument Department

2320-G W. Hubbard Street, Chicago 13, III.

MOTORIZE YOUR

Easily rigged up by anyone. Handles whole hom or 4 small chickens. Commercial-quality thrusus - enclosed gear-head moto. (116V AC) spring-termion bronce bearing permits spil removal-



Limited time, introductory offer Postpaid. (\$13.95 Denver and West).

R SALES CO. — Box 952 B — Muncie, Indiana

this ONE

GOVERNOR

fits 18 popular farm & industrial : gasoline engines



PIERCE LONG RANGE

Universal Governor

 Instant variable speed selection and accurate engine control at any speed setting within 1600 to 2600 RPM. Higher and lower ranges obtainable by simple change of pulley Also 'constant speed' operation.

 Accurate, dependable speed control for angines operating corn shellers, drag lines, hoists, are welders, trucks and tractors with power take-offs, etc.

Write for Complete Information.

ONLY

Pulley extro

Send Check or Money Order. Stele Make. Model of engine.

DEALERSHIPS AVAILABLE

** World's Most Empiricanad Servicus:

THE PIERCE GOVERNOR CO., Inc.

1654 Ohio Avenue, Box 1000 Anderson, Indiana, U. S. A.

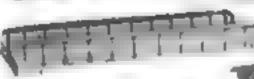
HO ENTHUSIASTS!

Brief Duphaneticous terrific accessaries and rolling stock!



Magor & de Bump Car \$4.85

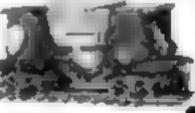
Depressed Center Flat Car 52 80

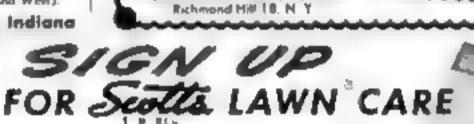


Girder Bridge \$2.00 Mat Blas Car \$3.00

-also complete line of model tanks, ships, planes. Send for complete catalogue 35c

COMET METAL PROOF CO. INC.





Just fill in the coupon below to receive a free 2-year subscription. In each issue of Lawn Care you'll discover practical, seasonal tips on how to make your lawn thicker, greener, were beautiful the whole year 'round. Thousands of readers tell us, "With Lawn Care guidance you can have the finest lawn on the street." Sign Jup for Lown Care today! O M Scott & SONS CO

21 Fourth Street, Marysville, Ohio Also Palo Alto, Colifornio

Nome	
	**
Address	

"Building Beautifiers Can Earn High Incomes

Colorcrete, a comentitious plastic, gives lifetime beauty and protection to drab, dirty masonry — concrete, stucco, etc. — on all kinds of buildings. Tough, tenacious, enduring. Easily cleaned, Helps to daylight dark interiors. Choice of gleaming white or 30 colors. Applied under pneumatic pressure to form an inseparable bond.





Mare Caroreretors are needed to supply the ever-increasing demand. Low investment appeals to men of Limited capital Work is easy, fascinating, high-ly probable, Broad opportunity to develop a lifetime business. No special ability or experience

needed because we supply full instructions and sales cooperation. Colorcrete machine is simple to operate, easy to move around. Write today for Opportunity Book.

Colorcrote Industries, Inc. 572 Ottawn Av., Hulland, Mich.

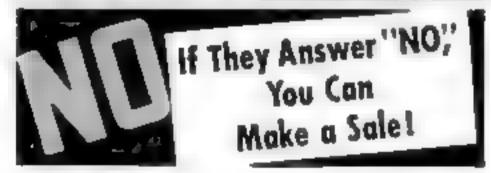
A complete Spin Fliching Outfit, only \$9.951

Post turk no backlash with CNITE Signally some settle Offer metodes a starty featu provedent them made press, system meshed for travelent ultil mile pres, sylvers meshed for almostic at he fortunates 3.72 mean ratio. Fig. 1 of present interminable speed 2.4 yet cuparts. AND a fig. 6.2 pt ce apin pater ratio. I present the per granted band sylver than the travelets grant fine than in the granter of travelets and travelets the fractions manifes champled band performance. A harmale band than 15 not authorized return for ceiusel Conburt of the part of authorized return for ceiusel Conburt of the part of the product of the part of the

ALSO. CHILD's 2 PASS. MOTOR CAR

Write for From Literature





Ask the first 10 . . . or 20 . . . or 50 people (householders, farmers, businessmen) that you meet. "Do you own a personal safe?" 90% will answer "No." Yet every one has valuables and papers that need fire and theft pro-

tection. Only SENTRY has what it takes to capture that market-quality, appearance, and a price that opens every pocketbook, yet gives you a healthy profit. Choice, exclusive terri-tories. Drop shipment if desired. Send for full details. Write to Dept. PS-8 giving address, including county. A



Add &s Postage If you can use a peters you can use a side first for booksepers accomments savesmen (hypering commentance, cost etc.) farmers housewives etc. For Armed Forces highly important then a most useful tool Easy to calculate instantly multiplying, proportions, division, roots atc. 'High Vision' Clear View Slide, Full 10" sule. A. B. C. D. Cl and R scales. FREE 20 pers (natraction book on how to set correct mawers instantly without pencil or usper.

Gene Loewy, 545 5th Ave., Dept. 44-T, N.Y.1

Cimit three rules to each couper



The Original Black Pistel

Front Mother of Pearl He with such EM-GE

In apprarance it looks like any fine actual pocket plated Constact. It is precision for chires of real gun seel Equipped with

for mosting each total at purposes some proceeding, dog stateting etc. 3.7 long total \$7.800 they exceed the form of the proceeding, dog stateting etc. 3.7 long total \$7.800 they exceed the poster permit needed. Bedfrey tenent Corp., Dept. P.B. 277 Broadway, N.Y.C. 7, N.Y.

YOUR OWN

One-place and eluminum propellers for cooling and ### Pullimed Unpationed Bore | Pullimed Unpationed Unpationed | Purpose | Pullimed Unpationed Unpat Ventilating. Unpotished

to the count in the section of the s

ELOPPERSONS ALUMINUM FBY., Popt. PS-54, Developert, lowe



Write now for free booklet and pictures of rupture care. You can be helped ... work steady, with low cost, easy to wear Web Truss, thousands satisfied. pt. PS-8, Hagerstewn, Maryland



Foley 2 wheel drive pep, speed salm mileage, lets thather keep dwhre drive power and I wheel or buck to erenote with fintertly con-Front and ascembly atanda 61:12 in 2-o beet dirice and drag, stops shimmy ruth front live west accuses got of case to 6 of pr Fire Wilse ech at Dodge 674 00 pr also Stopped Hab for Willys \$20 00. Under \$23.00. Lind House \$74.40 pr , Americal a Hub for Willys \$100 00. Finder \$74.40 pr , Americal a Hub for Willys \$100 00. The production of direct. Wille for folder.

WARN BOFG. BO., Hiverina Baz 6064-BO Santile DL Wank.



DIVING GEAR AND THE VALUABLE ROCKLETS TODAY
L B DIVERS CORP 1045 Broaten Ave. W Lee And 144 74 CM

1954 CATALOG - Send 25g

41 models for 'S41 See Werld's Fines; tine before you buy Rated tops to detien styling performance by the experts, '64 Catalog gift bunklet "Beat Selection. Operation, Maintenance" \$1.00

Custom Craft THE ORIGINAL PACKAGED* BOAT KITS

BOAT PLANS AND FULL-SIZE:
PATTERNS

Over 100 Modern plans and full size patterns. Racing classes, cruisers, inhouseds, authorists, spir boals. By famous des gners, 6' to 30', DESIGN CATALOG only 356. For Design Catalog plus boat building handbook send \$1.00.

CUSTOM-CRAFT (DEPT. B) BUFFALO 7, N. Y.



Guaranteed for Life of Car on Which Originally Indolled

Price \$4.95 Delivered to You

Patenta

Frad ng

Distributers

Wanted

Order from R. V. LEHNER, NESS CITY, KANSAS

NEW! TRANSISTORIZED WRIST RADIO



y projected profession Plane white any more it. Building and exploration after free-shaped quarks as an exhibite frame partly represent the property of the ordered and problems of principles of a selection of principles of property of the property of

- A WRIST BADIO" - N book ONLY \$176 pp

a propose on the action of all the control of the state of the stat

MUCKERT (LECTRONICS, \$44 7400, Washington 4, D.C.

NEW Level-X Car Compass



- COMPASS - LEVEL GAUGE - ACCELERATION INDICATOR

- all in one -

Figs any car. Compass rasy to compensate shows grades up or down to 20 regrees requests 36 % grade! Rugged construction, ideal for care, fracta tractors is Day money back guarantee. Bend for yours today?

Seite S-7 627 Selem Ave. Dayton 6, Ohio

Ohio Residents add 15c as es tax

Don't get stuck with a rust-clogged radiator!



At the first sign of overheading use new, improved Du Pont Cooling Cleanser

on moderate summer days, don't wait for a scorcher. Put in Du Pont Cooling System Cleanser right away. It cuts grease with detergent action, cleans out scale, and dissolves rust so that water drains out clear. And neutralizer in each can completes the job. Du Pont Cooling System Cleanser is thorough, safe, simple.





Keep your radiator clean with new

DU PONT ANTI-RUST

Once your cooling system is clean, keep it that way with Du Pont Anti-Rust. This new liquid inhibitor retards rusting, inhibits acid formation and lubricates the water pump as well!

DU PONT NO 7. PRODUCTS

From Chomical Research . . . For Easter Car Care



BETTER THINGS FOR BETTER LIVING ... THEQUON CHEMISTRY

MOTERI'S . Last-minute

news & notes

WEATHER REPORTS WHILE YOU DRIVE are now displayed along the Pennsylvania Turnpike. Automatic signs (connected to a rain-catcher, a temperature element and an electric eye that detects fog and smoke) show condition of the road ahead...Spare parts might be telegraphed anywhere in the world, suggests F. W. Cunningham of Arma Corp. Automatic machine tools can be controlled by patterns of holes punched in paper tape. These patterns, if coded for a teletypewriter, could be transmitted and used to manufacture the parts.

will be built to train sailors. Operating much like Link airplane trainers, it will duplicate a real sub's control room. Electric Boat Co. is to build it... Another way to make electricity from sunlight has been invented by the Air Force. Unlike Bell Labs' solar battery (PSM, July '53, p. 71), which contains silicon, this one uses cadmium sulfide. A four-by-15-foot slab would supply an average house... 3-D radar, a big help in controlling air-craft traffic, is being developed by several companies. Some proposed systems use mirrors or lenses to separate right- and left-eye images, eliminating polarizing spectacles.

A MUSICAL DOUBLE PLAY WAS OVERCOME at Chicago's outdoor concerts this summer by installing delay units in the loudspeaker system. Audiences had complained that they had to listen to the music twice, first from the loudspeakers and then from the band shell itself. To cure this, the delay units now record the music on tape, pause a moment, then run it off through the speakers so that sound from both speakers and shell reaches the listeners simultaneously... An "electronic doctor" will watch over patients on the operating table at one hospital. It keeps a continuous check on blood pressure, heartbeat and breathing. Thus



the surgeon can know immediately if trouble develops. The Physiological Monitor was made for the Veterans Administration by the Bureau of Standards... Watch your car closely, warns the FBI. Auto thefts, which dropped after a wartime high, are climbing sharply again (see chart at left, prepared from FBI statistics on city crime).

Reading time: 3 minutes to learn how to

- cut engine wear up to 38%
- · prevent loss of power, compression
- save 15%-25% on all . . . without ever changing your oil filter

This Gadget is Worth \$320,000,000

by Albert Wells

and I Discovered it by Accident!

IT ALL STARTED the day I got the bill \$214.36 for an engine overhaul—and I had only 28,000 miles on the car!

I told my troubles to a neighbor—a lubrication engineer—told him how I'd always changed oil every 1500 miles, changed filters every 5,000 miles. His answer floored me.

"You've been wasting your money," he said. "We've spent millions developing oil additives that keep carbon, gum and abratives from damaging your engine. Your oil costs about 15¢ more a quart because of those additives. Yet oil filters on the market today are made of rag or paper—they soak up additives like a blotter. The more often you change oil filters the more money you waste!"

But don't I need a filter to take the impurities out of

the oil?" I asked.

He took a deep breath."This will really shock you. Engine damage is done by abrasives 10 to 40 microns in size (a micron is .000039"). Your oil filter can't take them out because rags or paper can't be packed tight enough without stopping oil flow when the fibers soak up oil and expand."

"Isn't there any kind of filter that does the job it's

supposed to do?"

"No, except for the porous bronze filters they're making for supersonic aircraft. And you can't buy a filter like

that for your car."

I asked myself: "Why not?" Next day, I tracked down the outfit that was making the filters for aircraft, and got the answer. These porous bronze filters were made by fusing together millions of tiny bronze balls. Non-absorbent, they didn't remove additives, yet they removed abrasives in the 10-to-40 micron danger zone. Could they be made for automobiles? Again, the answer floored me.

LIFETIME FILTER TESTED IN CARS, TRUCKS, BOATS

Test models had already been used in cars and trucks

STACKLEMILA INK BEVITEZ TWA DIZLEMALINE

A dealer and distributor network is now being formed to handle demand generated by advertising and editorial features in national magazines. If you can qualify, you can be first with the most exciting automotive product of this decade, to win new customers and build a substantial business. These valued franchises are not being sold; they are awarded on the basis of ability to grow with us. For complete details, write or wire Continental Manufacturing Corporation, Dept. FPS-8 Washington Blvd. & Motor Avenue, Culver City, Calif.

91964



for militons of miles, proving the porous bronze filter:

1. Never needs replacing. 2. Saves the quart of oil thrown away with ordinary filter packs. 3. Increases engine life.

Trouble was, almost the entire production was being

absorbed by military and industrial users.

That day I went to work on the biggest job of my life: setting up production of the Lifetime porous bronze permanent filters for cars and trucks (an estimated \$320,000,000 replacement industry).

FOR YOUR CAR

Try the Lifetime filter on your car for 2 weeks: if it isn't all I say, you get your money back, if you keep it, you're through boying filter packs—the Lifetime filter is guaranteed for 10 years.

For complete unit, including case (install on any cur in 10 minutes), send make, year and model of your car and 312.95 (we pay shipping)

For conversion kit, which replaces your present filter pack with Lifetime bronze, send make and number of filter and \$6.95 (we pay shipping). NOTE: a few cars have full flow systems; conversion kits for these are \$13.95.

Or send only \$2 deposit, pay rest COD But do it today don't waste another cent on filter pack replacements!

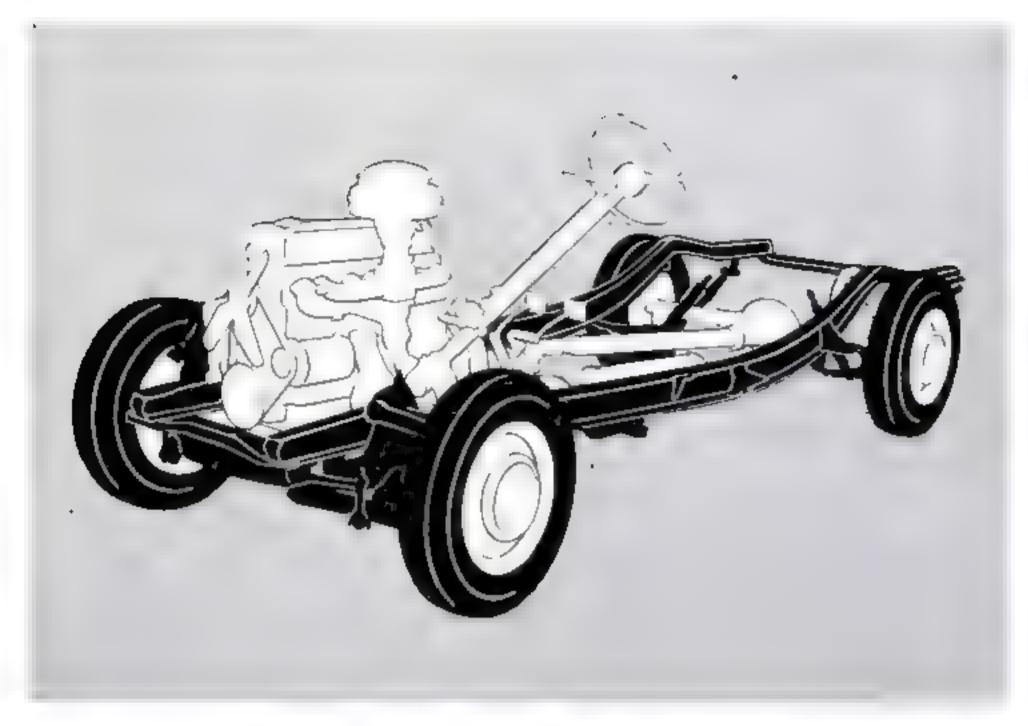


Complete Lifetime Falter, fits any ear.



Lifetime Conversion Kit; replaces ordinary packs with permitnent bronze element.

Permanent Filter Division, Dept. FPS-8 CONTINENTAL MANUFACTURING CORP Washington Blvd. at Motor Ave., Culver City, Calif
Ship 🗆 complete unit for
make, model, year of ear
□ conversion kit for
Name
Address
City Zone State



Advanced Chevrolet Engineering brings

BALANCED CAR SUSPENSION

for greater riding comfort

Behind Chevrolet's big-car riding ability is a lot more than just a suspension system. Actually it's a balanced combination of size, weight, weight distribution, tires and suspension system design that gives you that smooth ride you expect of a Chevrolet.

First of all, Chevrolet offers plenty of room in its wide, comfortable seats, cradled between front and rear wheels where they're least affected by road bumps. Chevrolet is a heavyweight in its field, and the pounds are nearly equally distributed on all four wheels for greater stability.

Then in the suspension system itself: Famous Unitized Knee-Action, exclusive with Chevrolet in its field. A front ride stabilizer that reacts against any body roll tendency. Long, resilient rear springs that, leaf by leaf, diminish road vibrations. Tension type shackle hangers that regulate rear spring deflection rate and provide for a uniform ride regardless of the number of passengers. And, double-acting airplane type shock absorbers that not only cushion spring action but stabilize roll and body sway as well. See your Chevrolet dealer and try out a new

Chevrolet. See if Balanced Suspension doesn't give you a much smoother ride. . . . Chevrolet Division of General Motors, Detroit 2, Michigan,

EVER FINER ENGINEERING

EVER FINER CHEVROLETS



Steelwork for the two-lane expressway reaches across a deep ravine near Princeton, W. Va.

Newest Super-Road Hops Daniel Boone's Mountains

Vaulting over rugged valleys, West Virginia's highway in the sky, open this month, crosses 76 bridges in 87 scenic miles.

By George H. Waltz Jr.

A SUPERHIGHWAY that engineers and traffic experts are calling "the most spectacular road in America" opens its tollgates to the public this month. This new road is the West Virginia Turnpike—a hill-hopping heavy-duty highway that stabs through rugged mountains where no good roads, and no continuous railroad line, had ever been built. The



ROAD SUILDERS' DREAM of a north-south chain of express highways from the Great Lukes to southern Florida hegins to come true with the opening this month of the West Virginia Turnpike, Map shows status of missing links and how new highway will connect with toll route now open, under construction or authorized from the East Coast to Chicago.

mile-a-minute super-road is the first completed link in a 1.300-mile Great Lakes-to-Florida chain of high-speed highways proposed by the traffic officials of West Virginia Virginia and North Carolina It cuts driving time between Charleston, West Virginia's capital and Princeton, on the Virginia border, from nearly four hours to less than two.

An Up-and-Door Texas

Anyone who has ever driven in and around the mountains of southeastern West Virginia—and up until now that's all you could do—will never forget the almost virgin ruggedness of the country. As one of the new road's engineers put it when he first viewed the waves of hills that roll toward the south, "I'd bet that if West Virginia were flattened out, it

would be twice the size of Texas!" And he was a Texan.

The new 87-mile high-speed highway does flatten out the mountains with deep cuts and leaps their valleys with bridges—76 of them, or almost one to a mile. In one six-mile stretch southeast of Charleston there are eight long spans and 20 high fills and embankments that bridge the valleys to smooth out the ridges. Few crows could now fly a straighter or more level course between Charleston and Princeton.

When you enter the road at Princeton, its southern end, you find yourself on a smooth two-lane concrete highway, each lane 12 feet wide and flanked by a nine-foot-wide macadam shoulder. Your elevation is 2.400 feet.

Steepest Grade Is Five Percent

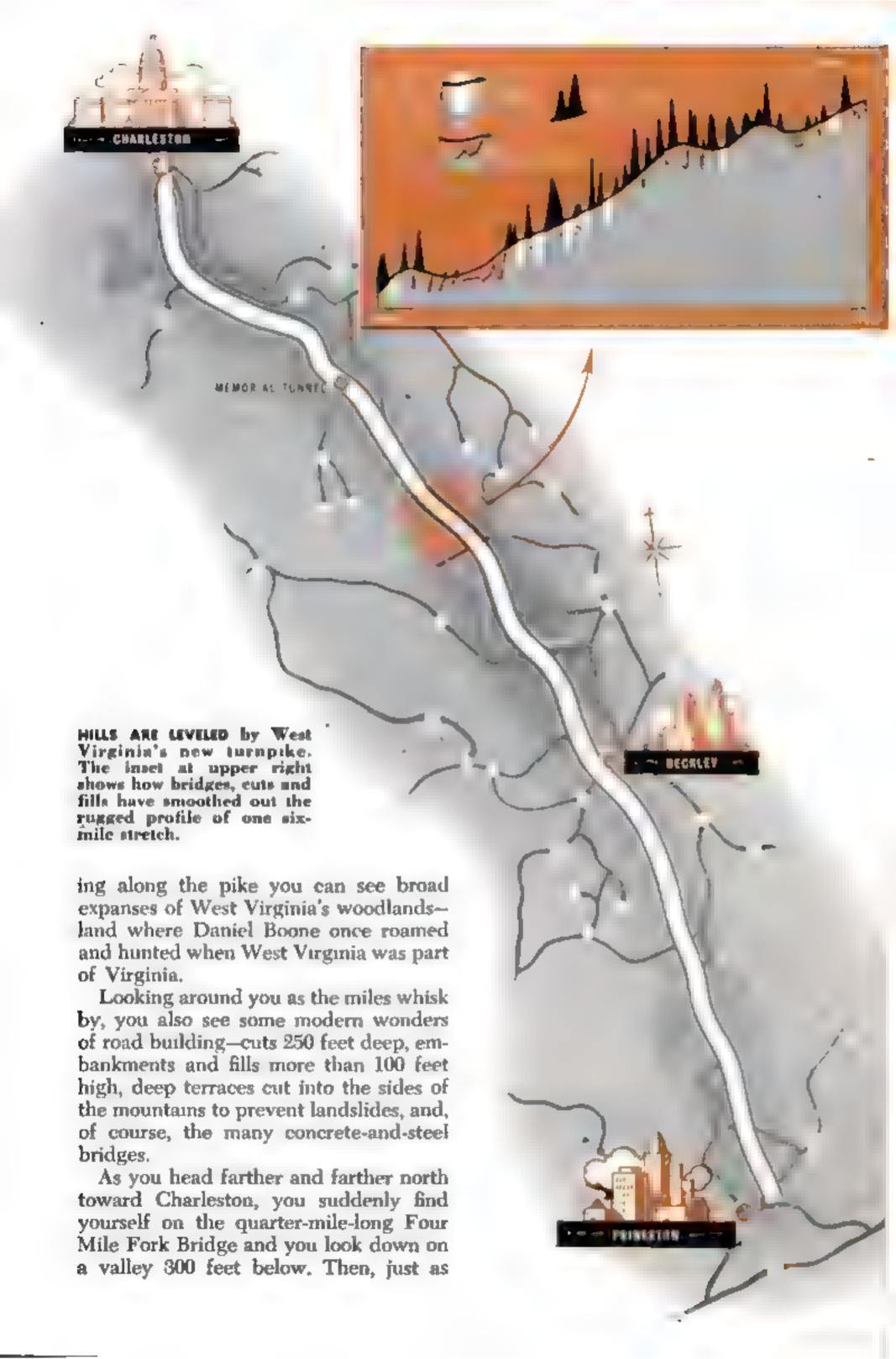
Some 18 miles farther north you find yourself on Flat Top Mountain, elevation 3,200 feet, the highest point on the road. From there your descent is gradual, until you finally drive into bustling, industrial Charleston. Here the elevation is only 600 feet.

In spite of this half-mile difference between the road's loftiest and lowest points, you never bit any hill that climbs more than five feet in every 100 feet (road builders call that a five-percent grade).

Most of the grades along the route don't exceed three percent—no hill at all compared to the region's old rollercoaster roads with nine-percent grades that almost stop a truck.

Besides leveling off the hills, the new turnpike has also ironed out the curves. Tight and blind 50-foot-radius curves are about par for the old, roundabout Charleston-to-Princeton route. On the new highway, you never ease into any curve with a radius of less than 1,000 feet and you can always see at least 600 feet ahead.

As you drive along, you see views of mountains and valleys that no motorist has ever seen until now. The older roads snake around the mountains, with intervening peaks cutting off the view. Roll-





Buildozers level a deep cut blasted through shale and sandstone for West Virginia pike.

suddenly, you plunge into the half-milelong Memorial Tunnel, which bores through rock 600 feet below a mountain top.

During the course of your drive over the pike you see another highway innovation. In the spots where there are sustained upgrades (even though none exceed five percent), 12-foot-wide "creeper lanes" have been provided for trucks. These allow heavily laden cargo carriers to pull off to the right where they won't slow down the normal flow of fastermoving passenger cars.

Plans Call for Future Widening

Eventually, when traffic warrants it, the road will be widened to four lanes throughout most of the route. Four lanes are already provided at the road's six interchanges, and the necessary grading for an additional 30 miles of dualization has been completed.

Close to 12,000,000 pounds of dyna-

mite were needed to blast out the deep cuts and to provide fill for the many embankments. In the year and a half of work, the road's builders—under the supervision of Howard, Needles, Tamemen and Bergendoff, the engineers who also masterminded the construction of the Maine and New Jersey Turnpikes—excavated and moved more than \$1,000,000 cubic yards of dirt and rocks. That's enough rubble to fill 2,000,000 big earthmoving trucks.

Fifteen miles of streams and creeks had to be diverted and about 35 miles of existing roads had to be relocated to make room for the new highway.

Yet, when all the tabs are in, the cost of the present two-lane, wide-shoulder road isn't expected to total more than \$1.300,000 a mile. That compares favorably with the \$2,000,000 a mile, four-lane New Jersey Tumpike that was constructed on relatively flat land. The toll, about 1.8 cents a mile for a passenger



Form on rails speeds pouring of concrete walls of half-mile tunnel through a mountain.

car, is in line with those of other highspeed roads.

With this first link-and the most difficult one to build-in the projected northsouth road chain now open, construction on two adjoining links is expected to get

under way. Virginia is about to start on a sister turnpike that will cut across the southwestern corner of the state, joining up with the southern end of the West Virginia pike and extending to

the vicinity of Mt. Airy, North Carolina. There it will link up with the projected North Carolina Turnpike that eventually will take the tourist through to Charlotte near the South Carolina border.

Plans for similar connecting highspeed roads in South Carolina, Georgia and Florida are under consideration.

Plans are also afoot to extend the West Virginia Turnpike northward with two spurs, one to Parkersburg on the Ohio border and the other to Wheeling, to provide connections with the existing Pennsylvania Turnpike and the under-

construction Ohio

Turnpike.

In the meantime, however, the completed West Virginia Turnpike will help to bring the motorists in the north-central tion of the country

closer to the vacation lands of the South, and to bring the products of the South closer to the industrial areas of Detroit. Cleveland and Pittsburgh.

During the first year, turnpike officials calculate that more than 2.133,000 drivers will use the highway. In 1958, they expect the total to be over 3,000,000. END

HINT TO AN UNHANDY HANDY MAN

I found a loose joint in the gas line Producing a bothersome hise. To make it up tight, I flipped on the light Inid sail qill adt to tuo amay buk.

-HIGH LINEBACK



Sandhogs Go Way Down Deep to Help Build Chicago Skyscraper

THE workman above is riding a bucket down a causson sunk to bedrock 102 feet under a Chicago street. Filled with concrete, the shaft will support a load-bearing girder of the 41-story Prudential Building, now going up two blocks from Lake Michigan.



Bike Pedals Pump Up and Down

JOSEPH BENOTTEAU, a French inventor, figured you waste a lot of energy propelling a bicycle by pushing the pedals around in a full circle. He altered the bike as shown at left, and now an up-and-down pumping motion keeps it moving.

Helicopters now blow raindrops off ripe cherries so that the fruit won't split and be ruined by the water. The violent downblast of the rotors does the job.

Skin Divers Seek Undersea Oil

Skin divers are going down as deep as 250 feet in the Persian Gulf to look for oil deposits. Led by Comdr. J. Y. Cousteau, famous French underwater explorer, a team of divers brings up rock samples for geologists of the Anglo-Iranian Oil Co.

A diver descends to the floor of the gulf in a sharkproof cage (right). He quits the safety of the metal bars to chip rock from the sea bed (center photo) and returns to the cage to deposit specimens (far right) or to make the ascent. But the cage is always nearby for a strategic retreat from snapping jaws, in case a maneater puts in an appearance.









Scientist wants to shoot up midget moon as

Poor Man's Space Station

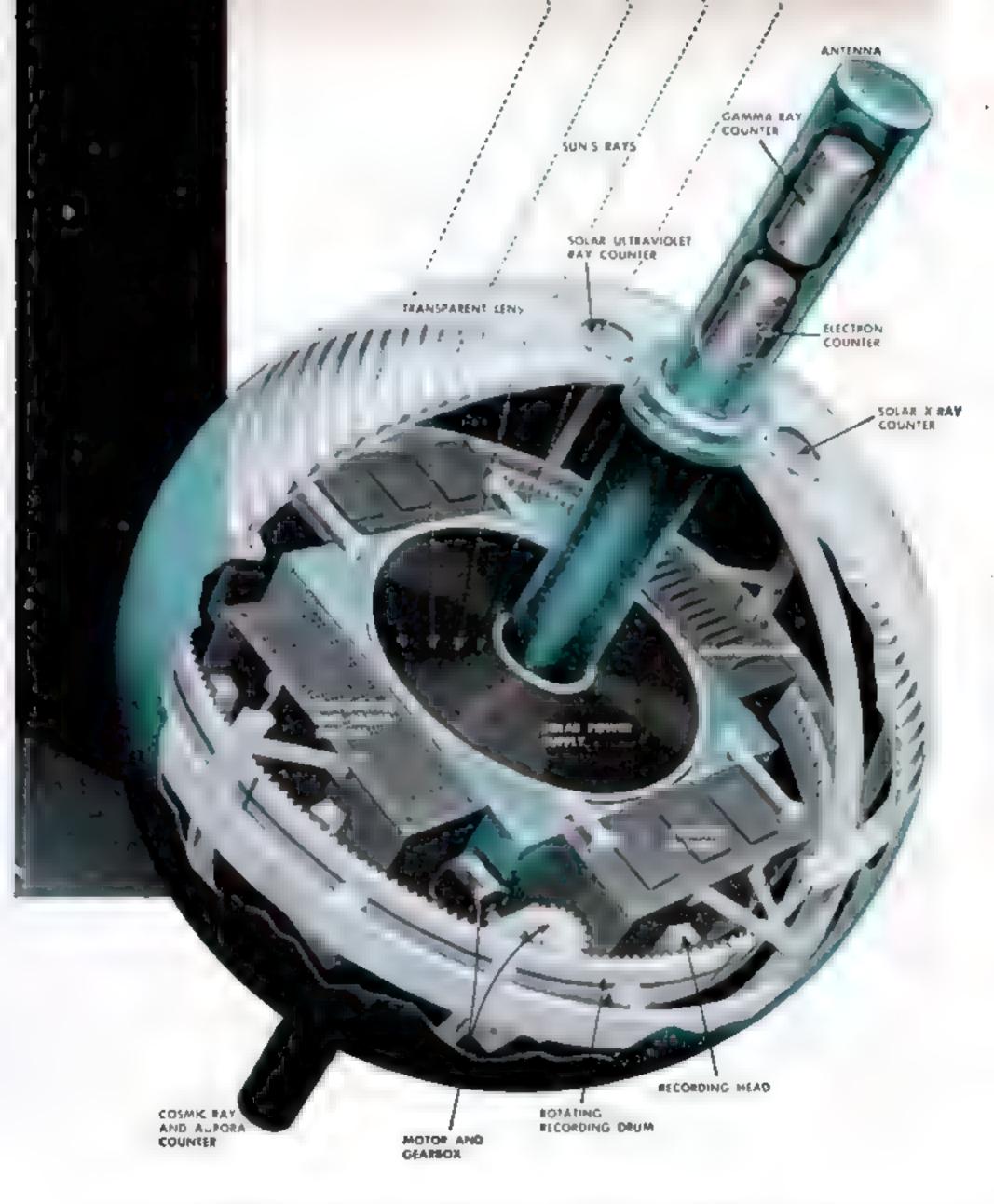
Spinning high above the earth, this MOUSE satellite would explore solar mysteries hidden from us by the atmosphere.

By Herbert O. Johansen

FOR a space station that would circle the earth as an artificial moon, the MOUSE is as modest as its name. It

would be small enough to be built in your basement. It would have no ambitions for interplanetary flight, yet it would be able to probe far enough into space to study mysterious solar and

77 POPULAR SCIENCE



cosmic radiations that now are hidden from us by the atmosphere.

The man who wants to build the MOUSE (Minimum Orbital Unmanned Satellite of the Earth) is a serious, 29-year-old physicist at the University of Maryland, Professor S. F. Singer.

Dr. Singer's midget moon would be no

military stronghold or bombing platform in outer space. Its mission would be peaceful. Circling at about 200 miles above the earth, it would carry not even a live mouse or monkey. It would use instruments to make its studies of the upper atmosphere and report back by radio new clues as to how the sun's radi-

ations affect our everyday lives in the forms of magnetic storms, the ups-anddowns of long-range radio communications and weather.

What Dr. Singer has conceived for the

job is a spinning, hollow aluminum sphere, about two feet in diameter and weighing 100 pounds or so. Most of the weight would consist of electrical-power equipment and the instruments for measuring cosmic rays, solar ultraviolet rays and X rays. The whole thing, he believes, could be put together for about \$50,-000. That wouldn't even buy standing room for a midget on one of those fancy, giant space platforms that would weigh many tons and carry a prohibitive price tag of around four billion dollars

To get his MOUSE up there, Dr. Singer would use a three-stage rocket. This would bring the cost up to only about \$1,000,000. That, he points out, is less than the cost of a single jet-fighter plane. He feels that existing military sounding

rockets or models under development could do the job. At the recent Third Symposium on Space Travel, held at the Havden Planetarium in The American Museum of Natural History in New York.

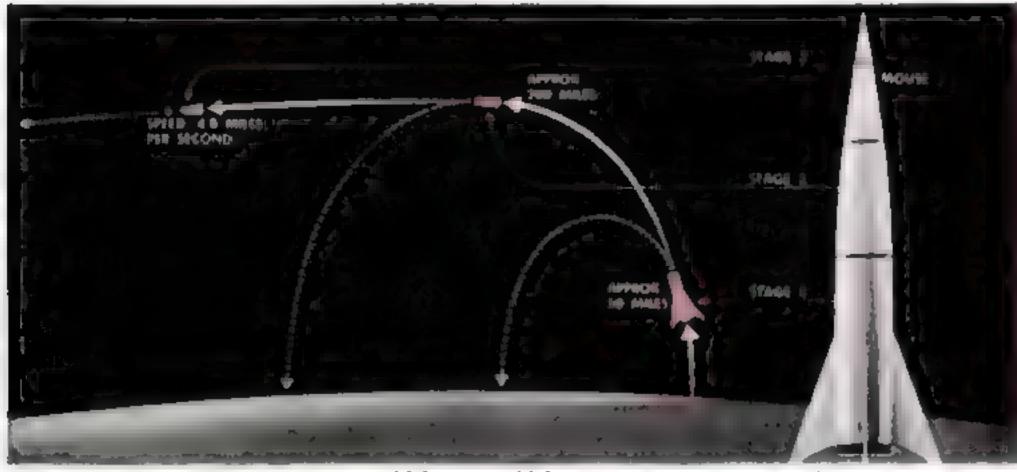
> he described the MOUSE as "a logical extension of the high-altitude research which we have been conducting in rockets over the past eight years."

For launching, Dr. Singer sees his MOUSE mounted and already spinning in a nose cap atop a pyramid of three rockets, with a modified V-2 as the springboard. As the V-2 was fired, the unit would leap straight up. Then, at about 50 miles up, it would start to curve shightly as the V-2 burned out and dropped off. Speed would be 7.200 miles an hour. As the second rocket

took over, the truncated pyramid would gain speed and altitude. The curve would increase. At close to 200 miles up, as the second rocket burned out, speed would be 12,600 miles an hour, and direction almost horizontal

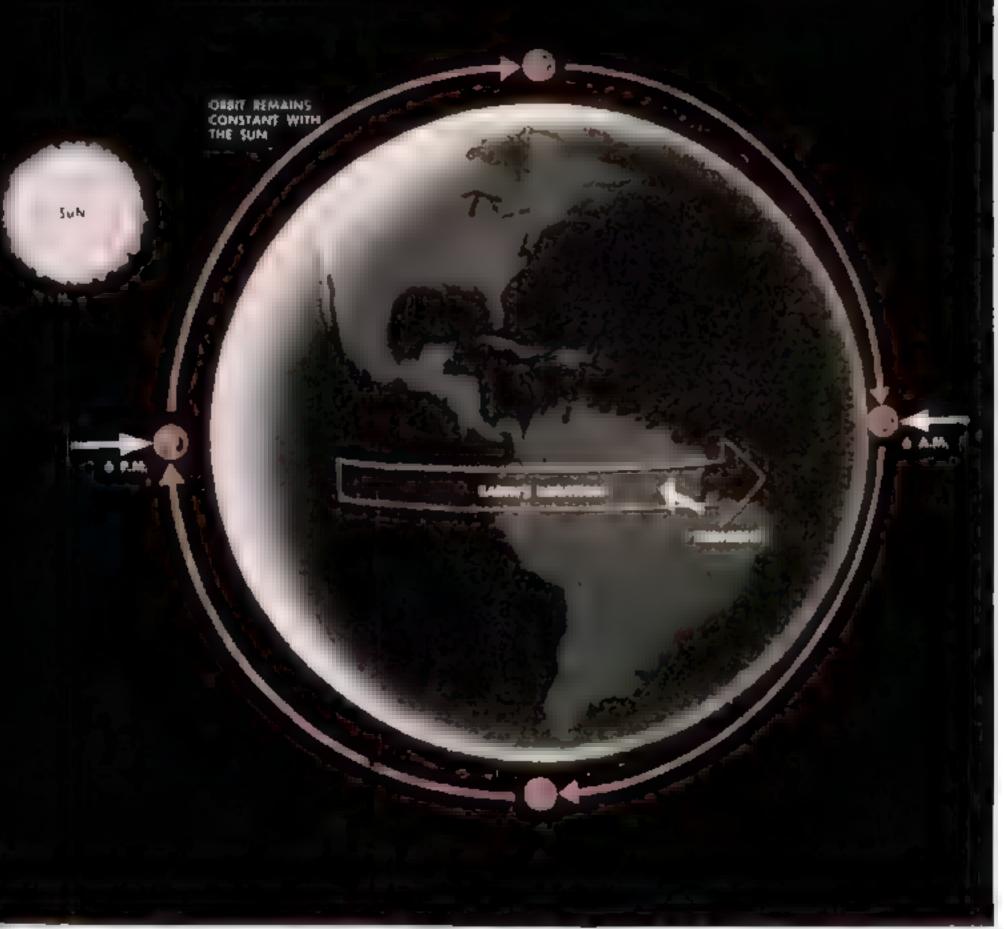


DR. S. F. SINGER, designer of MOUSE, is a veteran of high-altitude research and an expert on cosmic rays.



HOW THE MOUSE ARTIFICIAL MOON would be launched. The small satellite sphere would be mounted in gimbals on top of a threestage rocket. Before take-off, the MOUSE

would be started spinning on its horizontal axis. Each stage of the rocket, as it fired, would boost the satellite to a higher altitude and greatly increase its velocity.



A\$ AN ARTIFICIAL MOON, the MOUSE would circle the earth over the North and South Poles once every 90 minutes. Since the orbit would be in a plane perpendicular to the

sun-earth line, it would always appear overhead at either 6 a.m. or 6 p.m. local time. Spinning action of the MOUSE would keep same end of the satellite always facing sun.

Now the third rocket would fire for the final boost. Its job would be to kick the MOUSE up to its final altitude, a little more than 200 miles above the earth, and to its orbital velocity of 17,-280 miles an hour.

At that point, about five minutes after take-off, the MOUSE would be spring from its bearings to continue on its own in an orbit forming a great circle, going over the North and South Poles once every 90 minutes. And the burned-out third rocket would come tumbling after, itself a satellite.

The MOUSE, now an artificial moon, would have to be stable in traveling its

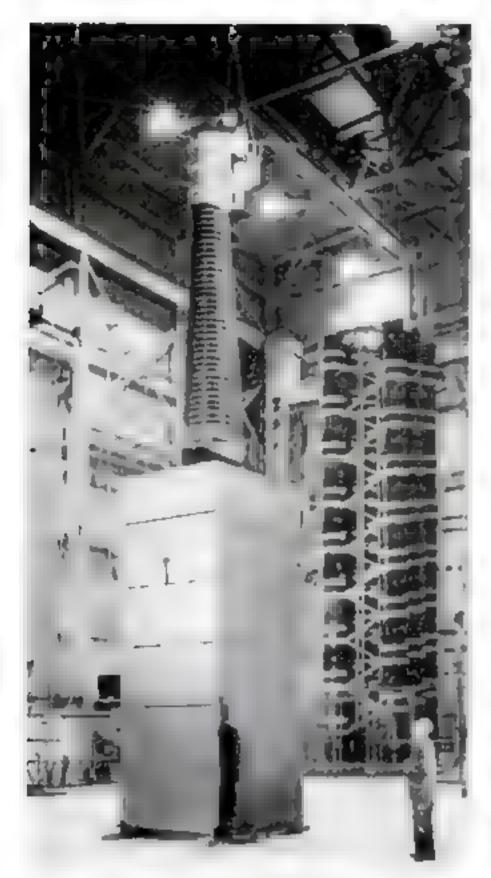
orbit. This would be taken care of by the spinning action started before takeoff. It would continue to spin in its orbit, but if necessary, small vanes in the satellite's skin would enable even the thin air 200 miles up to maintain the spin.

Windows to Let in Sunlight

This spinning not only would stabilize the MOUSE in its orbit, but because the orbit is over the poles instead of following the equator, the same end always would be facing the sun. Thus this end, in the form of a plastic lens, would admit the maximum of sunlight to activate a

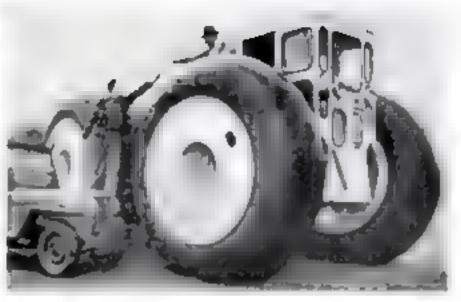
[Continued on page 222]

AUGUST 1954 75



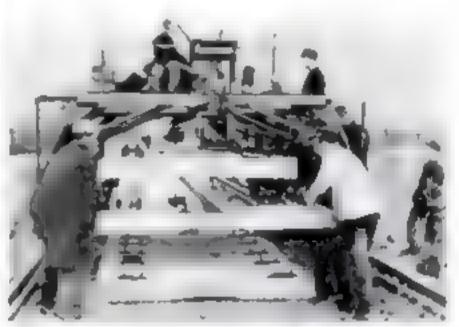
Inspector Gets Bird's-Eye View

THE engineer—way up there—had to ride a bosun's chair to inspect this transformer, largest of its type. A three-story, 50,000-pound monster, it has 50 miles of wire and a ton and a half of insulation. General Electric will use it to test circuit breakers.



Army Tries New Marsh Buggy

THE 22%-foot marsh buggy above is reporting in to the Army for field tests. Six 10-foot tires wheel it through sand and muck, or up steep banks. With rubbercleat chains added, the Gulf Oil vehicle takes to water like a paddle-wheel steamer.



Machine Rides Track It Lays

This mechanical track layer, humping itself along the very rails it later will lay on ties, is putting down almost a half-mile of track a day in Germany. Spanning the road-bed, it drops the rails—each 131 yards long—on ties as fast as these are put in position.

They Say Now

L. E. Briggs, Foun Moton Co.: "If tomorrow's car is to travel twice as fast as today's, it must first be made twice as safe."

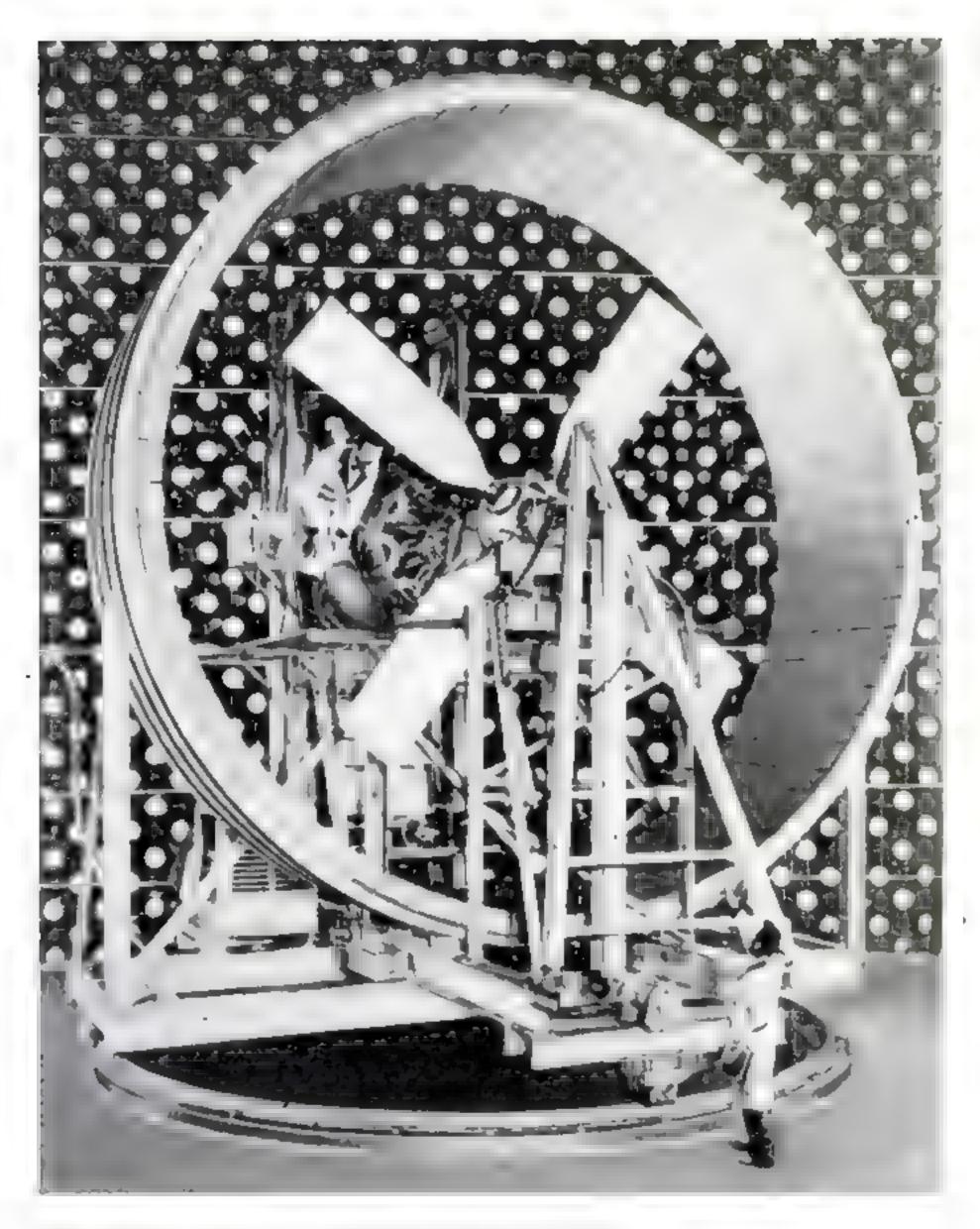
FRANCIS K. McCUNE, GENERAL MANAGER, GE ATOMIC PRODUCTS DIVISION: "Electric utility companies will be owning and operating a number of atomic power plants within the next 10 years."

WILLIAM H. WARD, VICE-PRESIDENT, THE Dt. Pont Co.: "The number of new chemi-

cals which can be produced is almost infinite and the research laboratories develop about 10,000 every year."

MAJ. MENANDER P DE SEVERSKY, PIONEER AIRPLANE DESIGNER: "The electronic capabilities of a combat aircraft have become even more decisive than its firepower."

EARL C. KUBICEK, ILLIVOIS INSTITUTE OF TECHNOLOGY: "It wasn't long ago that most companies would here anyone who could handle the job. Now they are looking for applicants who show the greatest promise and who will stay with the company."



Giant Gyroscope Tests Turboprops

AGAINST a polka-dot background of sound-proofing, high-performance propellers get the works in this gyroscopic whirl-rig that simulates actual flight-testing. When a propeller is spinning at high speed, the whole rig, mounted on wheels, can turn on a 20-foot circular track to duplicate side-

sway in flight. For safety, a 21-foot-diameter, barrel-like guard rim is lined with railroad ties. Engineers at the Caldwell, N.J., plant of Curtiss-Wright, who designed the device, say that because of greater control, it is more efficient than testing new prop units in an airplane.



LITTLE JET, named A1D Skyhawk, here carries extra fuel tank under fuselage, Presumption

is that atom bomb would be mounted there. Two other extra tanks can attach to wings.

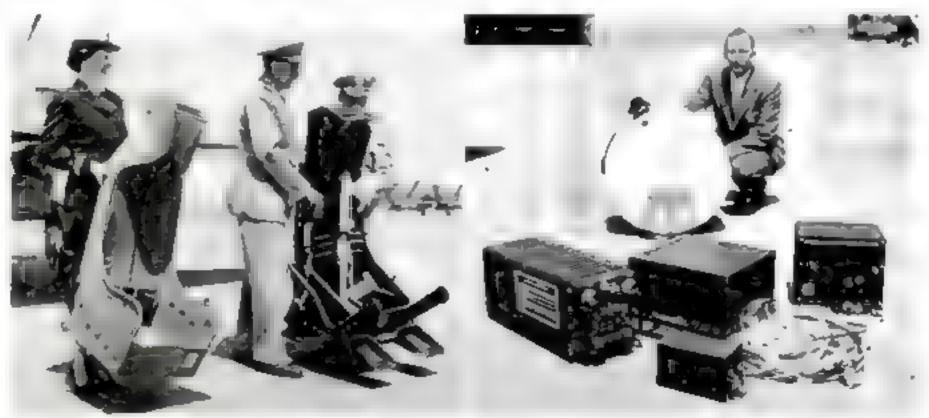
Bantam Jet Can Tote A-Bomb

A BANTAM bomber is being built for the U.S. Navy. It's smaller than most fighter planes. It may well be the smallest bomber in the world.

Yet it is built to carry an A-bomb. With extra fuel tanks, it can span the U.S. non-stop. At sea, operating from a carrier, it has

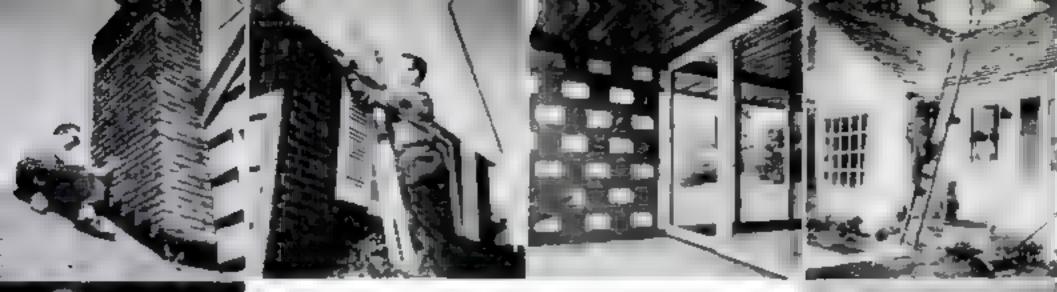
a combat radius of 1.200 miles. It's fast Douglas Aircraft, the builder, says it can outfly a Russian MIG.

Jet fighters weigh up to 40,000 pounds. The bantam bomber, which is powered by a single engine, tips the beam at less than 15,000 pounds.



SANTAM'S WEIGHT was cut by use of lighter components. Woman officer easily lifts 30-pound pilot-ejection reat (left), while two men wrestle with regulation 70-pound seat.

PACKAGE COMMUNICATIONS INSTALLATION, weighing 105 pounds, is held by Ed Heinemann, factory engineer. In foreground is standard equipment, totaling 160 pounds.

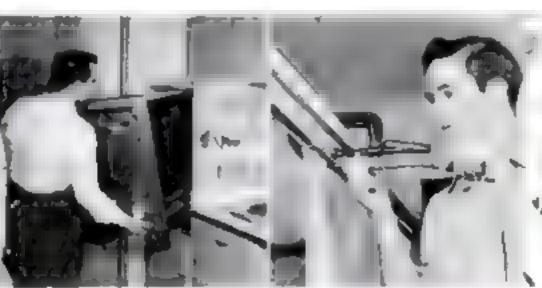




Next Month:

Special Section of Monoy-Saving Ideas For Your Home

The September issue of PSM will be packed with new ideas for every part of your house, from basement to attic. They'll save you money, add value to your home. Don't miss this bonus issue.





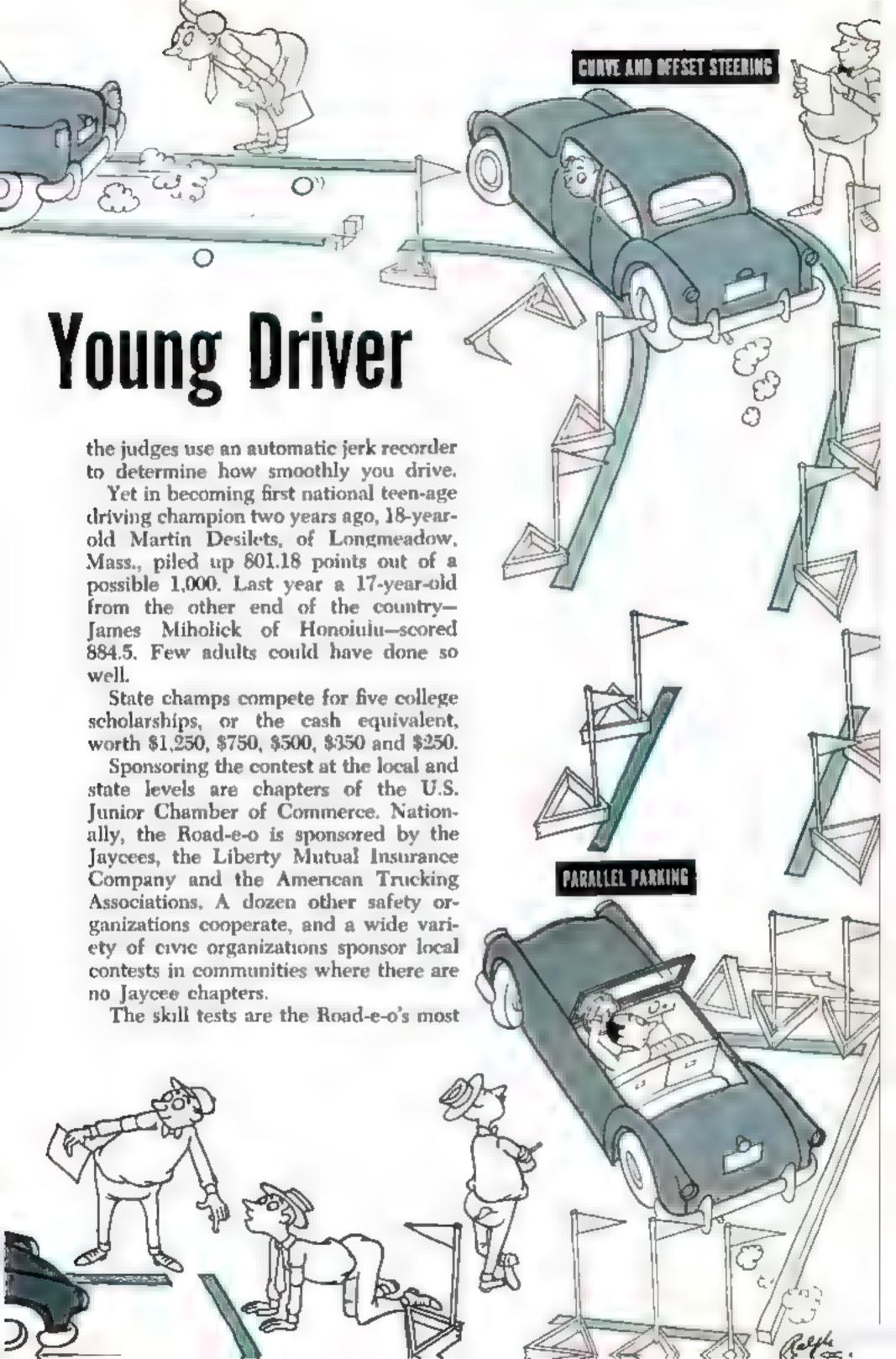


For the third consecutive year, POPULAR SCIENCE MONTHLY has been honored for exceptional service in the nationwide fight against accidents. PSM won a 1953 Public Interest Award, granted annually to information agencies by the National Safety Council. The citation is in the form of a wall plaque, pictured at right.

Accompanying the announcement of the award, which also went to 12 other national magazines, was praise for the winners from Ned H. Dearborn, council president: "Their initiative and skill are . . . really giving safety a voice that can be heard."









serpenting Manauvers are traced by a car's headlights in multiple-exposure photo at night. Entrants thread the course forward and backward, are docked for jerky driving.

spectacular offering. At all three levels—local, state, national—they start with something innocently called Straight-Line Driving. Anybody can drive straight, of course; the trouble is that here you have to prove it by keeping the left wheels of your car in a lane marked by five pairs of teed-up rubber balls, each pair so close together that you graze one if you miscalculate by even a whisper.

No Rubbernecking in Reverse

Going forward is not extraordinarily difficult, but now try it the other way—fine practice for backing down the driveway without touching a newly planted lawn. You get docked for every ball you nudge and for every time you stop. Entrants have picked their way through without grazing a ball but been penalized most of their score for leaning too far out to see where the dam things were

Next, in the local skill test, you wind your way through a row of barrels sitting in the middle of a space that looks scarcely wider than a one-lane road. You lose points for every instance of jerky movement, uneven speed, and of stopping and backing to avoid hitting an obstacle. Then you do it backwards.

For the third problem, you breeze along for 150 feet, drive through a gate-way as narrow as a garage door at 20 miles an hour, and then stop with your front bumper directly over a chalk line You'll lose two points for every inch you travel past this marker, and one point for every inch you fall short. And if you fail to stop smoothly, you'll lose 15.

Parking: Only Perfection Will Do

All you have to do now is to park parallel to the curb—with points off for failing to make proper signals, backing more than three times, racing or stalling the engine, hitting the stanchions that mark the stall you are trying to get into, and striking the curb.

At the state Road-e-o, the skill test is much the same except that the 'roundthe-barrel problem is replaced by something called Curve and Offset. You ease around a sharp curve, find yourself in a narrowing right lane, and then swing suddenly but smoothly to the left and straighten out—without brushing any stanchions. Next you retrace your course backward

The chief change in the national, except for a general toughening up, is the introduction of a problem that might be called "Please Put the Car Away." Here you turn from the street into a twisting driveway and then into a garage that wasn't built for these wide modern cars. Only a few of last year's state champs got in and out of the garage smoothly

The course was laid out in Washington's National Guard Armory and some of the drivers found it hard to remember that they had to make hand signals even though they were indoors, it was odd to be driving on a wooden floor, too Furthermore, each champ was using a strange car—a new Ford, Plymouth or Chevrolet, with standard gearshifts. But Road-e-o officials said the teen-agers did amazingly well, "A lot of adults," the course steward added, "can't back out of garages as these kids do."

Show Goes on the Road

In state and national Road-e-os, the obstacle course is followed by a road check. The one in Washington runs to 7% miles. All you have to do is drive through the worst of the capital's traffic while a judge sitting beside you in the dual-control car tells you what to do and checks off on his chart how you do it.

It's almost unbelievable how many mistakes can be made in the course of a 20-minute ride. The judge's chart lists 128 possible errors. Thirteen are things you can do wrong just in getting into the car and pulling away from the curb Others are common driving mistakes (Do you ride the clutch? Do you scoot across intersections? Do you rest your elbow on the window frame?) Attitude is important, too. Cockiness can cost you a pocketful of points. So, on the other hand, can hesitancy.

[Continued on page 236]



STRAIGHT-LINE-DRIVING TEST requires contestant to keep his left wheels on a path between halls 11½ melies apart. Going forward, he must do this while shofting up one genra



From 20 m.p.h. in 40 feet and stop with his front bumper directly above the white line. Performance is measured in half-inches.



Italy's Plates Light Up

ITALIAN traffic cops are going to have a lot less eyestrain—and speeders a lot more tickets-if a new license plate now on trial in Rome is adopted for official use.

Numbers made of white transparent plastic are set over cutouts in the metal and lighted by a lamp

behind the plate.

As shown in the photograph, the illuminated plate on the right of the car is considerably easier to read, especially at night, than the regulation license plate carried on the car's left.

>>> A new process impregnates paper with a chemical that kills germs. It is expected to be used in making napkins, soda straws and paper cups. And bakeries can now buy waxed wrappers with a built-in aroma of fresh-baked bread, white or rye.

New Big British Tank Gits Thar Faster

FAST and highly maneuverable. Britain's newest heavygun tank-the Conqueror at right-is so big it's said to dwarf a previous type that weighs 49 tons. Actual details are secret except that it carries a four-man crew.



New Big U.S. Tank Packs the Mostest

Our in front at left is Uncle Sam's mightiest tankthe long-secret T-43. The 60ton monster mounts a longbarrel, 120-mm, gun-enough firepower to outslug any tank in the world. Three machine guns on the turret can be loaded, aimed and fired from inside to protect the tank's five-man crew. Behind the T-43 are an M-47, a Patton-48 and a Walker Bulldog, all postwar tanks.



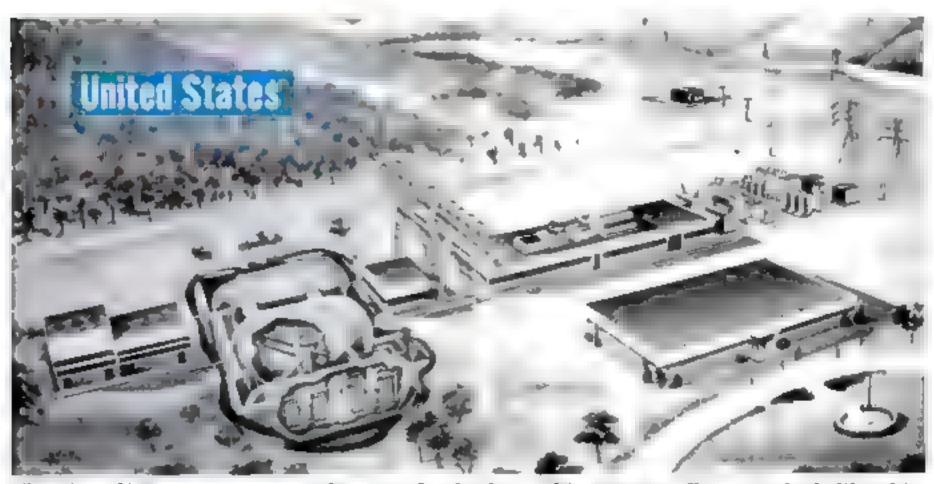
England's first atomic-power plant, fast being built (inset), will look like this model.

Britain Leaps Ahead of Us in Race for Atomic Power

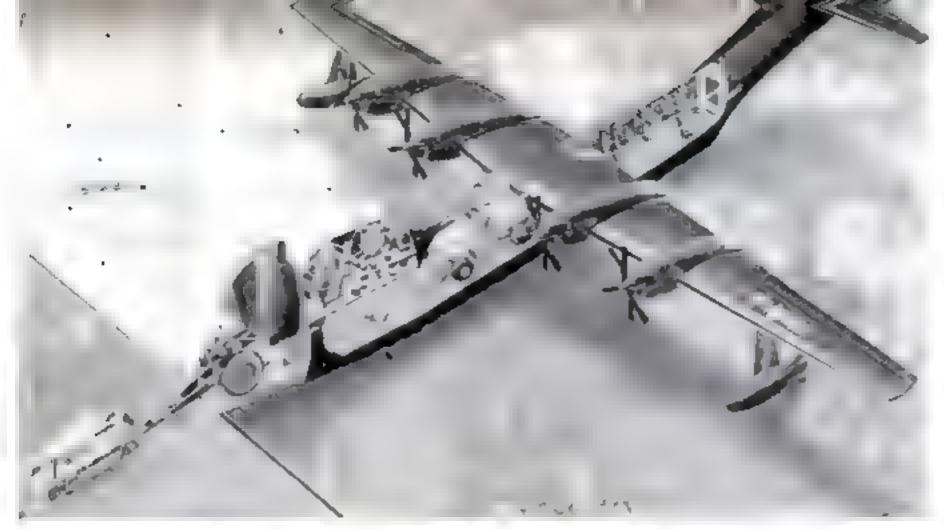
GREAT BRITAIN is a broad jump ahead of the U.S. in the effort to produce electricity from atomic energy. The walls of England's—and the world's—first commercial nuclear-power plant are already rising from the pastures of a former dairy farm in the mountainous county of Comberland. The plant is expected to start pro-

ducing around 50,000 kilowatts of electricity by the fall of 1956.

The first American atomic-power station, to be run by the Duquesne Light Co. of Pittsburgh, is still in the blueprint stage, with only an artist's conception (below) to show how it may look when, in 1957, it begins putting out 60,000 kilowatts.



The first U.S. atomic-power plant, to be built at Shippingport, Pa., may look like this.



Flying LST to Land Troops, Guns on Beach

What the famed water-bound LST landing ship did during World War II, this flying version can do, but hundreds of miles an hour faster. It is the R3Y-2, a nose-loading model of Convair's turboprop Tradewind. In action, the big plane will land off-

shore and taxi to the beach. In a matter of seconds a bow ramp will be lowered to unload Marines, guns, trucks and supplies. To pull away from the beach, the pilot, sitting in an upper-deck crew compartment, will simply reverse his props and back up.



All-Wing Helicopter to Fly Sideways

A FLYING-wing passenger helicopter is the newest idea in whirlybirds. It would travel sideways instead of pointing its nose in the direction of flight.

The novel scheme was born when Bell Aircraft pilots were testing a Navy antisubmarine, tandem-rotor helicopter. During test flight, the pilots began to favor sideways flight because "it just felt better." From there on company engineers took over and came up with the sideways-flying design shown in the drawing above. They claim that it will be more efficient, since the wing itself will supply some of the lift. Thus less power will be required from the rotors, saving fuel.



Double-Eye Recording Camera Traps Bum-Check Passers

When Thomas M. Lee cashed a check in a Los Angeles supermarket he saw the clerk photograph the check in a new machine. What he did not see was that the machine also photographed him—through a lens concealed behind one of the check-mark sym-

bols in its front (above left). That's how Lee's picture (above right) got on a manwanted circular issued by the Los Angeles Police Dept. The cops say the check was forged, The machine is distributed by Dubl-Chek System, 8301 Sunland, Los Angeles.



Troopers Set Road Traps for Trucks That Tote Too Much

Drivers of overloaded trucks are casting a wary eye around corners of California roads these days. Lying in wait may be a framework of metal holding four scales. If a truck driving over the weighing platform

carries cargo too heavy for the number of its axles, a state trooper hands the driver a court summons. Surprise is what catches the guilty—truckers never know when the rig will be set up along their routes.

How to Shoot 158 Miles... Straight Up

The slender cylinder being towed by the jeep in the picture below could be full of carrot juice or cooking gas. Actually it's full of delicate machinery, it's worth half a million dollars, and it's about to be shot almost 160 miles straight up—29 times higher than Mt. Everest.

Shooting a rocket into space is a complicated business, as shown by these pictures of the Viking missile—the most elaborate



ROCKET RIDES to launching area on three wheels, Its engine, made by Reaction Motors, delivers thrust of 20,000 pounds on diet of liquid oxygen, alcohol, peroxide.

2 into GANTRY FRAME goes rocket to get nose, tail. Nose totes instruments,



TOP POLISHED LIKE MIRROR, missile is now reads for fuel. Total length: 43 ft.

4 pumps highly explosive peroxide into fuel tanks.

5 STRING TIME is only minutes away as Viking poises on small launching platform.

ever released by the Government's White Sands Proving Cround.

Looking like an overgrown stovepipe, it must be hauled to the shooting site and have its needle nose and tail fins added. It is tucked as its liquid oxygen—at minus 300 degrees F—boils

Built by the Glenn L. Martin Co., this type of rocket holds the new single-stage height record of 155 miles.



THUNDEROUS ROAR of engine sends 712-ton rocket skyward. Blanket that insulated liquid-oxygen tanks from desert heat has been

removed. Missile, automatically radioing information on conditions in space, will reach speed of 4,300 miles an hour during flight.



Racer Doubles for Plane to Test Retractable Parachute

This racing car is trying out a new air brake—for airplanes. The brake is a retractable parachute designed to slow fast-landing jet planes. To test it without the bother of actually flying a plane, British engineers released it when the car hit 140 m.p.h., then pulled it back in by a motor when the car had slowed to 55.





Beavers Air-Dropped to New Sites to Engineer New Dams

BEAVERS living in forests overcrowded with them, and amply supplied with dams, are being airlifted to new homes where more dams are needed. U.S. Forest Service men capture the animals (above left) and pack them in pairs in boxes so they can be dropped by parachute (above right) to colonize remote mountain areas. As the box

touches the ground, it springs open automatically and mama and papa beaver scamper off to found new settlements.

Beavers were formerly transported into the wilderness by pack horse, but on the long journey they often became overheated and died. Flown in, they arrive in good health and take the jump undisturbed.

Atomic Fram **Totes Hot Toiler**

WORKMEN leaving hot areas in a British atomic plant are not allowed to walk through the corridors. They might spread radinactive dust from their clothing. So they get ceremonious rides. like ancient kings, moving from place to place on a special cart hauled by another workman.

▶▶▶Auto components get a rough workout at GM's newest test station-it's on Pike's Peak, Engines, transmissions and carburetors are subjected to high-altitude and steep-grade checks.





X Rays Make Plastic Tough

AT THE sterilizer above are two plastic bottles. That's right, two. After sterilization at 250°, one bottle is just a blob. The other, previously bombarded by electrons from a million-volt X-ray machine, is not affected by the heat, General Electric plans to market such heat-resisting bottles soon, foresees plastic hot-water pipe.



Detector Knows Iron from Gold

This detector can tell one metal from another. It signals loudly when iron is present, decreases in tone when gold, silver or other metals are found. The Gardiner Electronics Co., 2018 N. Dayton St., Phoenix, Ariz., says it will locate gold nuggets in streambeds, coins in beach sand, and pipes, wires and electrical boxes in walls.



Fortunes in Uranium

Along canyon rims and roadsides, by air. and in the depths of old ghost mines, U.S. prospectors again are striking it rich.

By Alden P. Armagnac

A LADY rockhound hunting specimens in Arizona came upon several petrified trees. They had turned to rock of such a peculiar yellow color that she chipped off samples of it and took them to the state geologist. It was carnotite, an ore of uranium, and the logs contained 200 tons of the mineral, worth a small fortune.

Another amateur rockhound, a Colorado high-school janitor, found an outcrop of uranium ore on the eastern slope of the Continental Divide near his home. Weekends and vacations, he shoveled away at it, until he had a carload to ship to a Government purchasing depot. Now the Atomic Energy Commission has declared his find an important one, miners are working for him to exploit it, and he's a janitor no longer.

A 34-year-old Utah prospector has sold \$2,500,000 of the dull black rock that his diamond drill struck while he was seeking canary-yellow carnotite ore. His black stuff was uraninite, the most prized of uranium ores—pitchblende is one variety of it—and one rarely found in this country.

Production Sours Under AEC Spur

By guaranteeing to buy uranium ore at generous prices for years to come, and by offering handsome bonuses for discovering it and starting new mines, the Atomic Energy Commission has spurred U.S. production. At the latest tally, more

MILION-DOLLAR GRIN is worn by Charles A. Steen, 34-year-old geologist and prospector, after he hit uranium jackpot by discovering a fabulous transmite lode near Monb. Utah.

PETRIFIED LOGS of Colorado Plateau, like this one in mine, are rich in high-grade carnotite. Biggest may yield 100 tons apiece.

Photo train Engineering and Mining Journal





UP THERE AND DOWN HERE, in underground workings, Colorado Plateau miners find carnotite-ore pockets scattered through rock. This scene is in larger-than-average mine.

than 600 mines in this country were yielding uranium. U.S. output has outstripped Canada's, and it now ranks second only to that of the world's richest source, the Belgian Congo in Africa.

Anyone can get into the act, It's like the days of the forty-niners all over again. This time it's in modern dress—in an era of jeeps and planes, of neon signs and plastic-and-chromium trimming. But it's the same irresistible, age-old lure of fortunes in mineral treasure.

The uranium hunters' Klondike, the Colorado Plateau camotite district, extends over western Colorado and parts of New Mexico, Arizona and Utah, This booming area's mesas, flat-topped hills of red and buff sandstone with rugged canyons between, are dotted with sagebrush and uranium workings

If you see a hole burrowed into a canyou wall near a mesa top, a few timbers, perhaps a bit of rickety-looking track, that's a carnotite mine. If you expected big buildings, excavations and rock piles, you'd go right by one without knowing it.

Someone and his pal scrape together an air compressor and drill, picks and shovels, a one-ton ore car or just a wheelbarrow, and they're in business. They push a filled ore car by hand to the mine entrance—or, if pickings have been good, they may treat themselves to a small mine locomotive. You can buy one powered by compressed air, seen in the picture on this month's cover, for the price of a car: \$1,420 and up.

Pocket/uls of Money

These are midget mines, and for good reason. Most of the ore deposits scattered through the sandstone are small pockets, of only a few hundred tons or less. But once in a while the deposits run to exceptional size. Fifteen have been discovered to date that contain more than 100,000 tons of carnotite ore apiece. Generally a lode of such size has a gross value of more than \$3,000,000.

"Rim-walking" prospectors checking surface rocks with Geiger counters, or just looking for the yellow color of carnotite outcrops, have still to search innumerable miles in outlying parts of the district. But in the 50-mile strip called the Uravan Mineral Belt, where the hunt has been most intensive, most new deposits are being found today by sinking drill holes from the mesa tops. Depending on how deep ore is struck, it's mined by removing the surface layer or by driving a tunnel inclined gently from the surface—or, below 200 feet, by sinking a vertical shaft. Horizontal tunnels bore into the more easily mined outcrops on the mesas' sides.

Pay Dirt for the Santa Fe

The Colorado carnotite deposits, long considered a geological rarity, now are known not to be unique. Recent discovery of similar ones in the Black Hills of South Dakota has opened a new uranium field. And a railroad has found itself the owner of a uranium mine because a Navajo Indian sheepherder, who had seen ore samples at a trading post, recognized carnotite in limestone rock along the Santa Fe right of way near Grants, N. M.

A curious variety, asphaltic carnotite, is being exploited at Temple Mountain,

Utah. Ores containing both uranium and copper have turned up in southern Utah and Arizona.

Carnotite and other bright-hued deposits are "secondary" uranium minerals formed by weathering and chemical change from original deposits of "primary" uranium minerals, dissolved by ground waters and scattered afar. Much richer are deposits of primary uranium minerals like Africa's and Canada's black pitchblende. Some have been found in this country.

Pitchblende actually was the first uranium ore ever mined in the U.S., away back in 1871 at the Wood gold and silver mine in the Colorado Front Range. It went unrecognized and was thrown out on the dump, where a geologist found and identified it. From the following year to 1919, this and neighboring mines produced small quantities of pitchblende, perhaps 300 tons in all.

Ghost Mines Yield Again

Now U.S. geologists are combing more carefully the drifts and crosscuts of long-abandoned ghost mines of the Front Range, in addition to mines still working, for pitchblende—and finding it. Their reports contain such phrases as, "Uranium occurs as pitchblende in veinlets from 1/32 to 2 in. wide."

Fantastic as it may seem to big-mine operators, pitchblende is such precious stuff that a veinlet only one-eighth of an inch thick can be mined at a profit.

Literally colorful is the Marysvale district in Utah, lately the most consistent producer of pitchblende from U.S. vein deposits, with most ore coming from the Prospector and Freedom mines of the Vanadium Corporation of America. Here is a large-scale counterpart. experts point out, of the rainbow-colored ores surrounding the famous Congo pitchblende veins (see color diagram on page 97). At Marysvale, in 1949, the first minable green and yellow secondary uranium minerals were discovered near the surface. Deeper probing turned up other bright-colored ones-and then, below 70 feet, brought geologists to the



THIS IS THE WAY you stake a claim for uranium. Notice posted on tree gives ownership and claim's name—here, "U.S.V.C." for U.S. Vanadaum Corp., and "Brazil" for name.

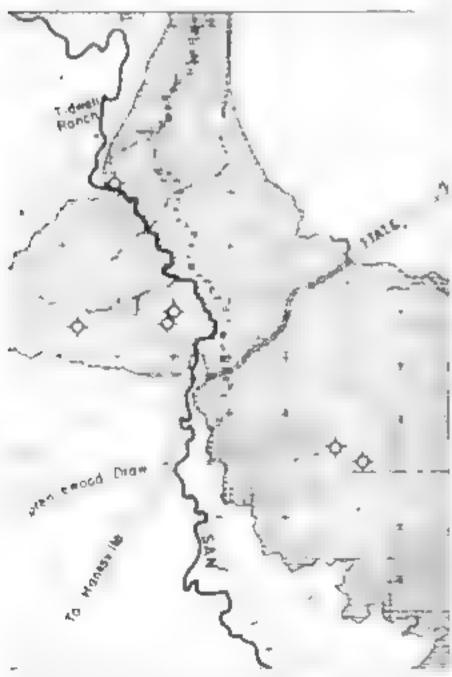


AFTER SURVEY and required "discovery cut" with a buildozer, the prospector sets up corner posts to mark his claim's boundaries, A claim covers area of 600 by 1,500 feet.



MERE'S WHERE the uranium is in U. S., by recent official AEC map. Principal source has been four-state Colorado Plateau carnotite district. Important new ones are South

Dakota and New Mexico carnotite deposits, Utah and Colorado pitchblende veins and uraninste in Utah. In South, phosphate rock for fertilizer yields by-product uranium.



SIX LIXELY PLACES to find uranium in Utah are marked by four-spoked circles. Maps like this, based on serial radioactivity surveys, are posted by AEC to aid prospectors.

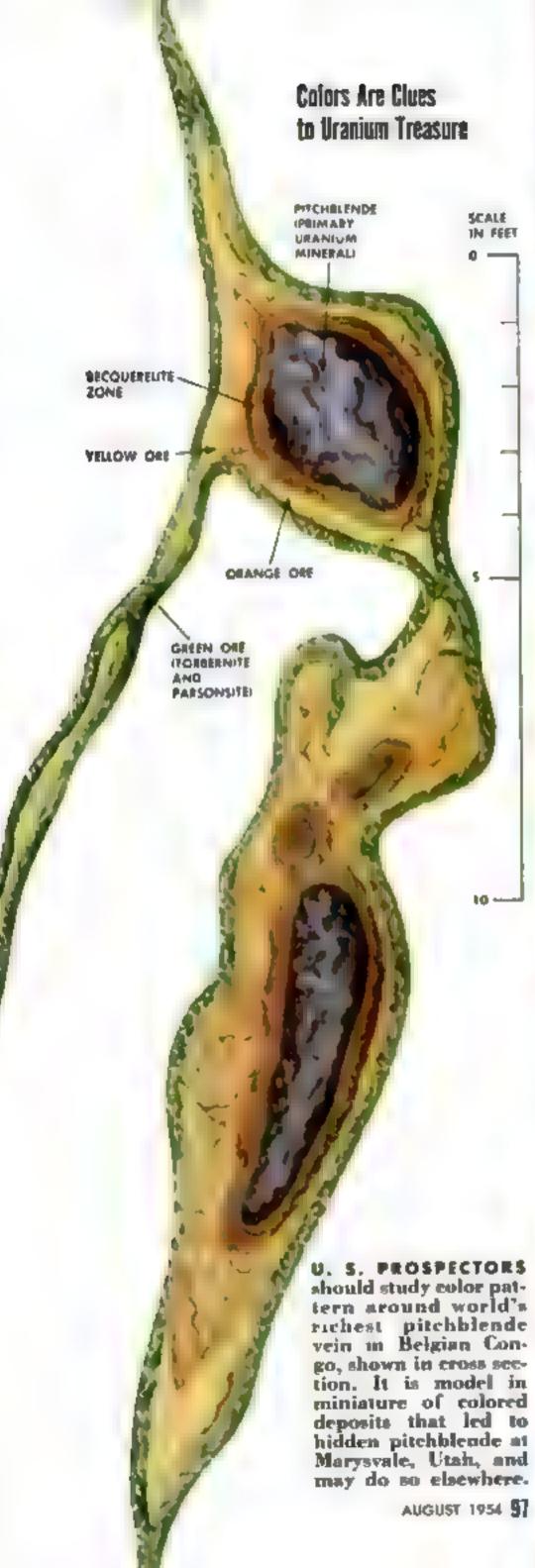
pitchblende. This color pattern may prove a guide to hidden, deep-lying pitchblende elsewhere, the experts say.

It remained for a young geologist too hard up to afford a Geiger counter, Charles A. Steen, to make the country's most sensational uranium strike. Under the broiling Utah sun southeast of Moab, one July day in 1952, he watched his rented diamond core drill bite into the rock. Then, less than halfway to his intended 200-foot depth, the rig broke. Down the hole went the lost tools and his last cent.

Automatically he gathered up the unpromising core samples of rock so far recovered, stowed them in his jeep and drove back toward town, crushed with disappointment. At a filling station on the way, Steen found a friend checking ore samples with a Geiger counter—and, though sure his own were worthless, tested them. When the counter went crazy, he knew he'd hit the jackpot.

His borehole had penetrated a 14-footthick bed of phenomenally high-grade uraninite ore, at 70 feet, Subsequent

[Continued on page 240]



Cal Burne



CARNOTITE ORE in typical stockpile contains small proportion of carnotite, impregnating huff-colored sandstone. High-grade carnotite has bright vellow color (picture on cover).



AT COLORADO MILL, chemical treatment of ore extracts urantum in form of "yellow cake." Slupped in steel drums to the ALC, it will yield uranium metal for reactors and bombs.

BY-PRODUCT from same ore is vanadium, recovered here as "red cake," Mater is paid for both uranium and vanadium in his ore.

at the amount of a



How Man Put Light to Work

A CHANGE of expression means a change of head in Dollywood, film studio of Joop Geesink in Amsterdam Holland. There small, blenke pappets

without strings have been making a stopmotion movie called "Light Through the Ages." The 10-minute film was created for GE to show throughout the U, S, in celebration of the 75th birthday, Oct. 21, of practical incandescent light.

Realistic dells of plastic, wood and cloth, dressed expertly, were moved by hand and repeatedly photographed right as they played the scenes below

Dutch puppets play historic scenes in stop-motion movie marking



AT FIRST TERRIFIED when lightning set a tree ablaze outside his eave, early man soon learned to utilize fire to light the cave.

TALLOW CANDLES lighted the pages on which medieval monks wrote and decorated important texts before the invention of printing.

EGYPTIAN TORCHES consisted of flaming linear soaked with olive oil. Men burned oil for illumination for several thousand years.

WHALE-OIL LANTERNS illuminated the docks of young America. The discovery of petroleum in Pennsylvania in 1859 smilled them out.





electric bulb's 75th birthday.



ROMAN LAMPS of bronze burned olive oil, too. They represented a considerable improvement in lighting fixtures, first made of stone.

YOUNG EDISON demonstrated the first successful incandescent light—carbonized cotton thread glowing in a vacuum—Oct. 21, 1879.



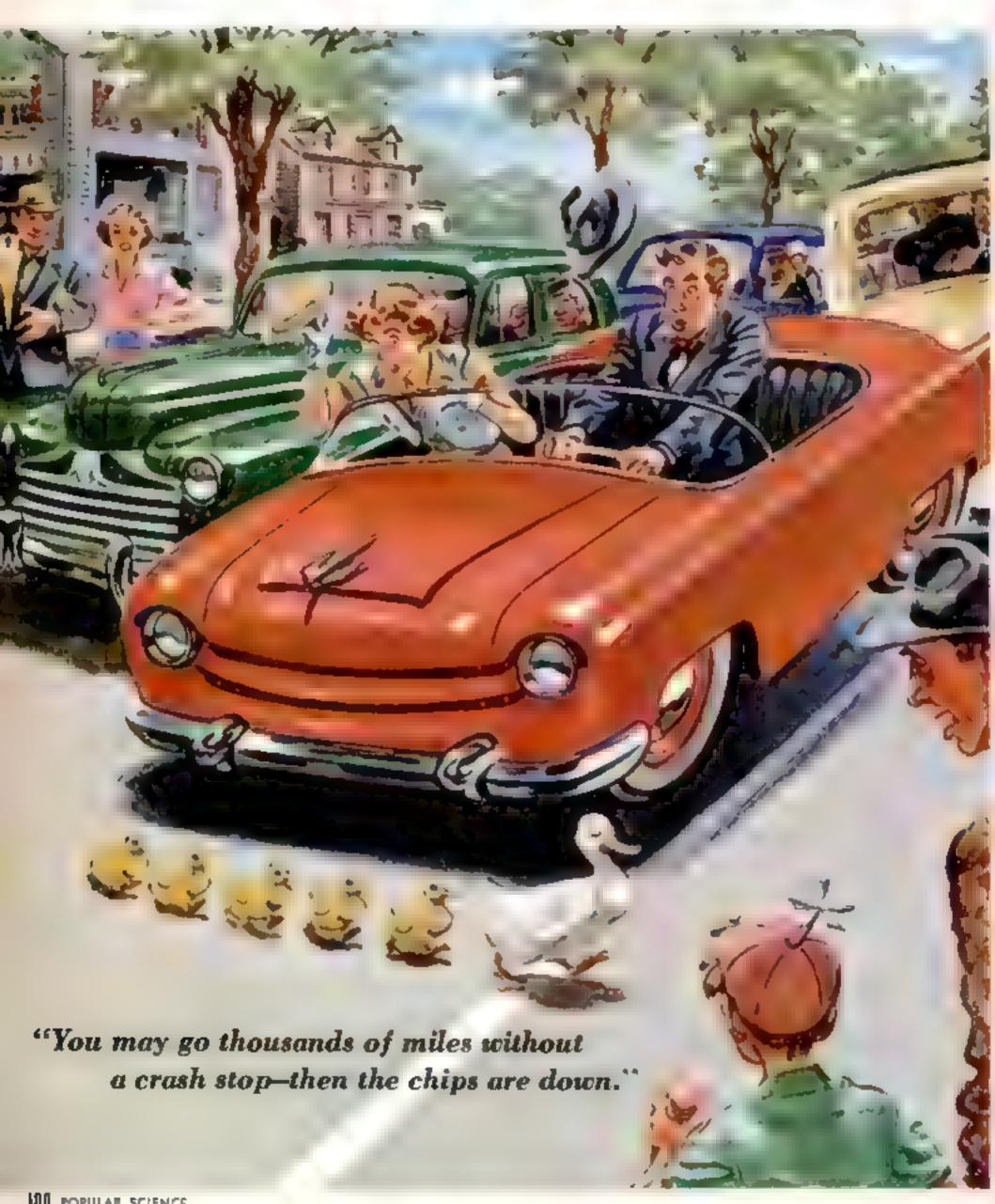


Heaven-Bent, a new guided missile designed and built by General Electric roars upward from its launching platform for an experimental flight at the Air Force Missile Test Center in Cape Canaveral, Fla.



First Color X-Ray, a shot of a mouse, was made by Dr. Ralph S. Mackay, University of California. He took three X-ray pictures at varying wave lengths, then projected them through three different color filters.

The Truth About Your



Brakes

Can you count on them? Are they keeping up with power? What's Detroit doing about it?

By Frank Rowsome Jr.

ENERGY-ABSORBING gadgets like auto brakes do not have the glamour of energy-producing gadgets like engines, but they are fully as important; running out of brakes tends to be more exciting than running out of gas.

"Accidents due to defective brakes," the Association of Casualty and Surety Companies reports, "have contributed to more than 40 percent of all mechanical-defect accidents." Insufficient or inferior fluid, worn linings, and worn master or wheel cylinders are the chief culprits.

But sudden, total brake failure is actually quite rare. Far more common is a gradual deterioration of stopping performance, built up over thousands of miles. Since it comes imperceptibly, it can sneak up on a driver: on a hard stop the pedal will come nearer the floor, but only a little nearer than it did last month

A complicating factor is that expert drivers can be trapped by their own competency. With a combination of skill and good judgment, you may go thousands of miles without a crash stop—then, suddenly, the chips are down. That's a bad time to discover worn brakes.

What is Detroit doing about it?

Even though brake engineers have enough glittering equipment and Greek-letter mathematics to split an atom, brake work is largely done on a let's-try-it-and-see basis. Brake design is intricate, and a theoretical approach is hampered by technical mysteries (what is friction anyhow?) on which experts disagree.

There is also general Detroit agreement that you don't fool around with brakes. Styling spears, power-operated

How to Use Brakes



USE BRAKES SPARINGLY. Unnecessarily hard or frequent braking not only wastes gas, tires and brakes, but it adds to fatigue and is the mark of an unpolished driver.



PUMPING OR FANNING THE PEDAL (a rapid on-off movement) can help with directional control on a slappery surface, or when a pedal goes dangerously low.



IN A STOP FROM HIGH SPEEDS, it is preferable to build up the rate of deceleration as quickly as comfort permits, doing most braking while still traveling fast,



if trapped by a Tight TURN, try to stay off the brake pedal. If the turn is going to make tire-to-road adhesion chancy, you can't afford to spend adhesion in braking.



MAKE A PRACTICE of using the brake pedal to test for possible slipperiness when you come to a different kind of road surface, or the weather changes.



GUARD AGAINST the tendency to grow so accustomed to your car's brakes that you allow them to become badly worn.

Brakes gulp energy even faster than today's engines produce it

clima into a zippy 1954 SEDAN, select a deserted stretch of highway, and belt the gas pedal. When you get up to 75 m.p.h., hit the brakes hard—just shy of a squawling crash stop. You'll get back to zero fast. Where it

took a 200-plus-hp, engine 20 seconds and 1,300 feet to accelerate you, the brakes do the opposite in less than five seconds and 275 feet. The energy they soak up then amounts to 500 or 550 horsepower.

antennas, and even the seductive curves of your combustion chamber can be left for the brass and the sloganeers to tinker with. But nobody ever bucks for anything but the best possible brakes that the budget can provide.

What are the problems? A brake designer, in theory, can count on six inches or more of pedal travel and a peak pedal pressure of about 150 pounds. (Even Grandma, using her elderly knee as a kind of toggle, can push that hard.) But the competitive heat is on the brake designer to lighten the job. So he specifies a brake-shoe linkage that has a servo effect—one that uses a "wrapping" shoe that borrows energy from the car's momentum to do part of the work.

This is fine—a kind of poor man's power brake—but it brings its own headaches. One is the need to equalize wear among brake shoes; another is that brakes must obviously also stop a car from rolling backward; a third is that if you get too much self-actuation, the brakes may accidentally lock. A continuing problem with self-energizing brakes—which most

U.S. cars now use—is that the more "servo" you put in, the less constant it is.

But constancy is the prime brake virtue. To be truly safe, a brake should deliver a predictable, proportional response despite wide variations in speed, load, temperature, humidity, frequency of applications and a host of other variables. (You can see why the pros usually refer to a brake as "she" and use the term "morning sickness" to describe one common ailment. This is the snappish habit otherwise docile brakes have of pitching you on your snoot the first time you touch the pedal in the morning—a matter of moisture condensing inside and upsetting servo calculations.)

The harried designer has a packet of other problems. Where's he going to dispose of brake torque, a gigantic twisting force that, on a hard stop, wants to pretzel the suspension? What about forward weight transfer, which tries to nose-dive a fast-stopping car? How can he best divide up the work between front and rear brakes when a car will have enormous variations in load distribution?

At proving grounds and in haical centers, they say:



Brakes are not, on performance, lagging behind engines. They have had an increasingly mean job: heavier cars, higher average speeds, transmissions affording less engine braking. But they are holding their own. Stopping performance is demonstrably better than before the war.

- Power brakes are here to stay, having outlasted some sharp behind-the-scenes controversy.
- Disk brakes, although under study by many makers, are apparently not going to supplant drums in the near future. The best of them work well but they are too expensive.
- The fade problem—progressive failure of brakes during severe use—is being assailed from several directions, including special cooling and linings.
- Brake governors—clever little gadgets that unlock a sliding wheel to reduce swerve in crash stops—are being studied.

Oто 75 м.р.н.



75 to 0 M.P.H.



20 SECONDS



5 SECONDS





55UHP.

How's he going to get big, cool-runing drums with small tire diameters? (Bigger drums wouldn't be an unalloyed blessing: more area and more leverage, at the cost of higher surface speeds and more unsprung weight.) And how's he going to design a hydraulic system that will withstand 1,500 pounds to the square inch, last indefinitely, never fail suddenly, and cost less than the competition's?

They love power. Brake engineers as well as lady drivers like power brakes; there's less need to sweat for a soft pedal, and tougher linings can be specified. They don't stop a car any faster, of course, but they make it easier to produce any given deceleration.

duce any given deceleration.

Standard equipment on some '54 cars and comparatively low-priced options on all others, modern power brakes are vacuum-operated boosters that multiply pedal input by three or more. A good deal of ingenuity has been spent in providing reactive feel, vacuum storage, and "fail-safe" performance.

Low-pedal power brakes-with total travel about that of the accelerator-let

a driver swivel his foot on the heel between brake and gas. This is quick and easy, but also has provoked a sharp undercover fight on safety. Reducing pedal travel reduces leverage produced by the driver's foot, which is all right as long as boost is available.

Say the high-pedal advocates (notably the four Chrysler divisions): An engine killed at less than 20 m.p.h. on a winding downgrade may not be momentum-started through an automatic or over-drive transmission. An inattentive driver—let's call her a dopey dame—may not know it, and may use up the vacuum reserve unconsciously. Then a sudden emergency, on a low-pedal car, may call for immensely high pedal pressures.

That there is some cogency to the point is suggested by Olds' use this year of a bigger vacuum tank, and by Buick's new optional electric vacuum pump. This writer has tried out both high- and low-pedal jobs with engine cut and vacuum reserve expended. In the high, effort is only a bit more than with unboosted brakes. On low-pedal cars you have to

What's the Quickest Way to Stop Your Car?

STRAIGHT CHALK MARKS REMAIN STRAIGHT ON UNBRAKED WHEEL

STRAIGHT MARKS CURVE UNDER MODERATE

PART OF CONTACT AREA SLIDES UNDER ANY BRAKING TORQUE





ROLLING FRICTION

IF you believe that locked wheels will pull a car down faster, you'll be backed by Ford engineers. If you pick braking-just-shy-of-shding, you'll have many GM and Chrysler people ne your camp

Most automobile people have long cherished the notion that maximum braking comes when a wheel isn't quite dragged, maximum acceleration when it isn't quite spun. It is a plausible

notion. Ford's experiments, however (myolving stata friction coefficients, torque and other factors), suggest that it isn't true

SCIDING PRICTION-

4541

However the experts resolve the dispute, it is plainly an excellent idea not to rely on sliding wheels to stop you.

tromp very hard indeed. Startlement is perhaps a big factor which suggests the merit of running an occasional rehearsal.

Those wonderful disks. Prophets have long been hailing disk brakes as the coming thing. They do a fine job on heavy aircraft, have been widely touted as a major reason in Laguar sportscar victories, and have done well on the heaviest Chryslers.

Disks-which work by pinching pressure on a disk turning in the same plane as the wheel—have big advantages. Unlike a drum, a disk won't distort under pressure. It won't expand with heat in a direction that reduces useful pedal travel. Counting both sides, it has a bigger "swept" area than a drum. And open, racing-type disks are about as perfectly ventilated as a brake can be.

The drawbacks are also considerable. If you expose the disks to grit and rain, you'll shortly get pitting and roughening of the disk surface, which is murder on lining life. (Car brakes, unlike racing jobs, must go thousands of miles without attention.) But if you enclose the disk in a housing, as Chrysler does, you go back to building ovens-enclosed containers with heat sources inside.

Moreover, by the time you get a disk brake smooth, self-adjusting, self-actuating, and all the rest, you end up with an intricate, costly mechanism.

Anatomy of fade. A brake is an ener-

gy converter that trades foot-pounds for calories. When you overfeed it energy, it produces too many calories, which generally means fade trouble. Fade is the alarming loss of stopping power that can occur when you hit the pedal hard and often, say, down a long mountain grade.

There's a distinction between pure fade and "loss of pedal." The latter, when your foot goes smack to the floor, may come from low fluid, wear, or drum expansion; but unless there is actual hydraulic failure, you can correct for it in a pinch by pumping the pedal back up True fade is different: a heat-caused change in the coefficient of friction between lining and drum. You push like all get-out, and the pedal still has travel left, but you don't do much stopping.

The experts aren't sure how it happens. Some talk obscurely about monomolecular behavior. Others theorize that oily liquids used as a binder in linings come boiling onto the surface under intense heat. There's no question that extremely fade-resistant linings can be made; the difficulty is that you have to pay elsewhere in things like loss of smoothness, higher unit pressures, or a tendency to score drums,

The other avenue of attack is through cooling. This includes such measures as the electric blowers on the rear brakes of the Mexican-race Lincolns.

[Continued on page 232]

INA POPULAR SCIENCE

THEIR GOAL WAS IN SIGHT when Louisville's amateur astronomers reached this stage of the 20-year project. It consisted of making a wooden pattern for the cell that would hold their 20-inch mireor. Here was work at which those who had no talent for grinding mirrors could show their skill.



Big-Time Telescope Built Basement Amateur stargazers in Kentucky worked 20 years at their hobby.





THIS 20-INCH PYREX DISK became the telescope's mirror when it finally had been ground, polished and plated with a half-

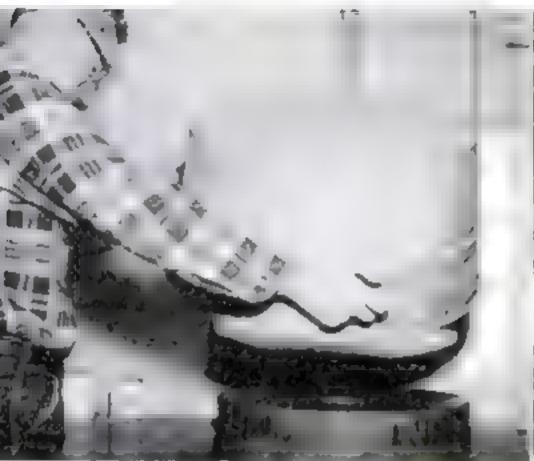
ounce of silver. The three-inch hole in its center allows star reflections to come back through the mirror and into the eyepiece.

planning and fussy work, including 4,000 hours of glass granding in a basement, to get the 20-incher ready to sweep the heavens.

You'll hear no complaints, though, from the mathematics professor, gas chemist, bridge engineer, machinery inspector, retired manufacturer, electrician, draftsman and machinist who did most of this work. After two decades of anticipation, each one of them, as a member of the Louisville Astronomical Society,

now happily owns a key to an observatory that he helped to build. There he can climb a six-foot ladder and gaze through an eight-foot tube at Venus or Mars or any other celestial resident to his heart's content.

Once the project, years ago, had progressed beyond the talking stage, the amateur group moved blithely into professional circles. They ordered a mirror from the Corning Glass Works, whose engineers had just poured and annealed



AN OLD WASHTUB in Dr. Walter L. Moore's basement workshop protected the delicate mirror from dirt between grinding sessions.



FINISHING A MODEL for a cast-aluminum zing, one of those required to mount the amateurs' telescope, which is of the open-tube type.



THE MAIN SUPPORT of the telescope followed this pattern, shown as it was being assembled by an Astronomical Society craftsman.



FRAME FOR A 20-INCH MIRROR, the east-aluminum cell above was carefully measured and marked before being drilled for mounting.

the giant 200-inch mirror for the Mt. Palomar telescope in California. The 20-inch, 110-pound disk that they got for their money—only \$84.79—was poured according to the same formula as its 200-inch cousin.

When the mirror arrived, marks of the brick mold were still on it. The rough edges had to come off, and that started the years-long, piecemeal ordeal of grinding and polishing.

"We could have finished the job a lot

sooner if we had been better opticians," says Louis Aker, one of the group, "Three different times our mirror grinders found that they had ground hollows in the disk and had to start all over again."

When the mirror was ready, the amateur stargazers went to work on the observatory, a structure 17 feet in diameter, made of concrete blocks. Its alumnum dome, originally intended to top a silo, was fitted with rollers and a track in order to revolve.—George Laycock.



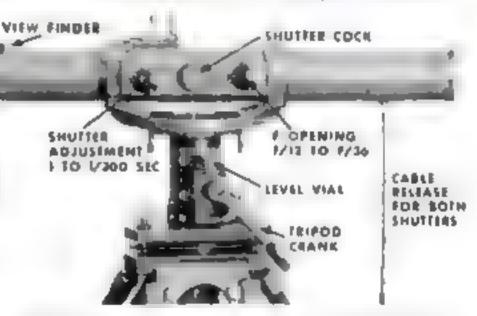
Police of Bern, Switzerland, take 3-D photos to settle dispute in auto-bieyele accident.

3-D Photos Fix Accident Blame

Camera eyes carried in police cars help tell the judge who was at fault in a traffic crash.

IN SWITZERLAND they don't argue about who was responsible in a traffic accident. That's because Swiss police cars carry a witness that can't lie or forget—a special camera that takes 3-D photos for judge and jury to see in case of a dispute.

Viewed through an inexpensive stereoscope, enlarged photographs give indisputable evidence of what happened. From the pictures, the police can plot the accident scene on maps that give such information as width and incline of roadway, skid



Controls of 3-D camera are on a tubular bar.

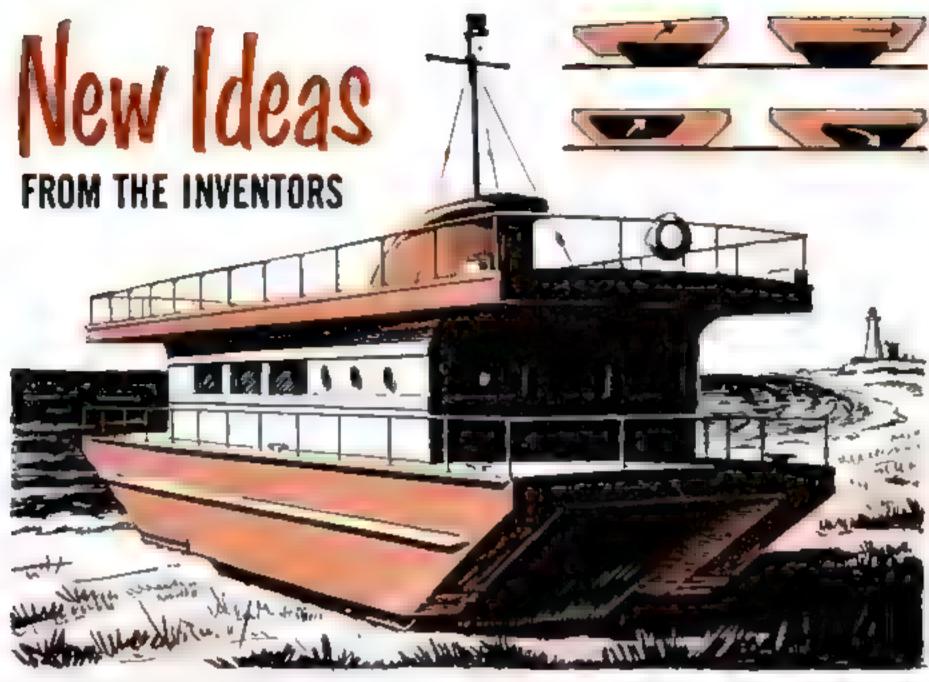
marks, distance and direction of travel before and after the impact.

The camera, made by the Wild Survey Instrument Co., has two lenses (really two complete cameras) mounted about four feet apart on a rigid tubular bar to give exaggerated stereo views. The device is mounted on a tripod with a head that can be leveled like a transit. When the scene of the accident has been centered through a view finder, the bar is raised on the tripod to take pictures from an unobstructed height.

Diagram below was plotted by Swiss police from photographs taken by stereoscopic camera.







Boat to Walk or Float. A vessel that could step through marshes or over solid ground would never be landlocked by shallow channels or low tide. It could navigate unnavigable waters and "dock" itself on any

handy beach. This amphibious craft would have a central hull flanked by pontoonlike steppers. When it struck bottom, its outer shell would rise and thrust forward—or backward—in a kind of leapfrogging motion.



2 Rollers to Wipe Dipstick. Checking your oil would be a cleaner and easier job if you had this gadget under the hood. The bent spring wire could be clamped to any convenient part of the engine; it would support a pair of replaceable, felt-covered wiper rollers. Before checking oil level, you'd simply draw the dipstick between the rollers.



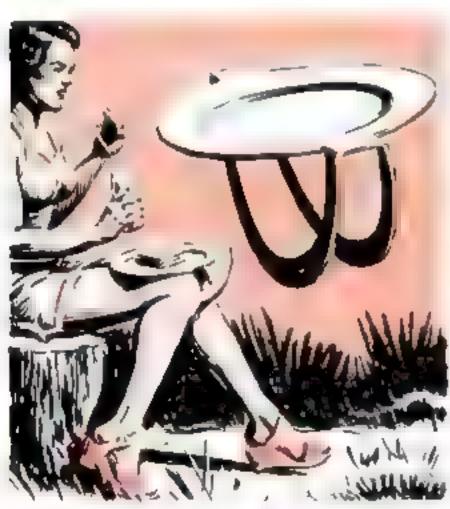
3 Hanger Magnets to Grip Clothes. Dresses and other light-fabric garments might hang straighter if they were pinned down by magnets. A flexible yoke would support a pair of magnets above the bar of this hanger. Attracted to iron inserts in the hanger, they'd grip the cloth and keep it from bunching up or shipping sideways.



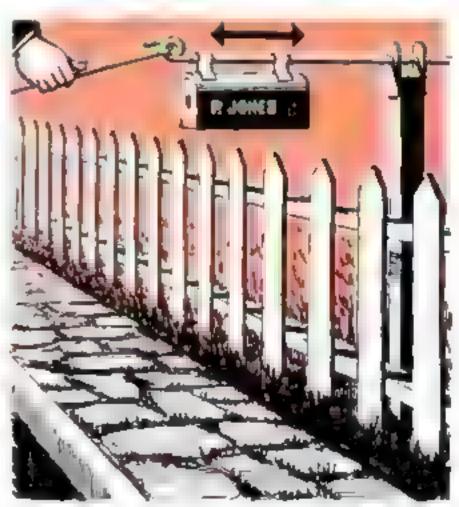
4 Oar Band to Free Rower's Hand. This two-part attachment would let a troller row with his wrist while holding his fishing rod in his hand. A ridged block fastened to a wrist strap would interlock with a grooved saddle that could be clamped to any oar. If the rower got a bite, he'd shde his arm to the side to free it from the oar.



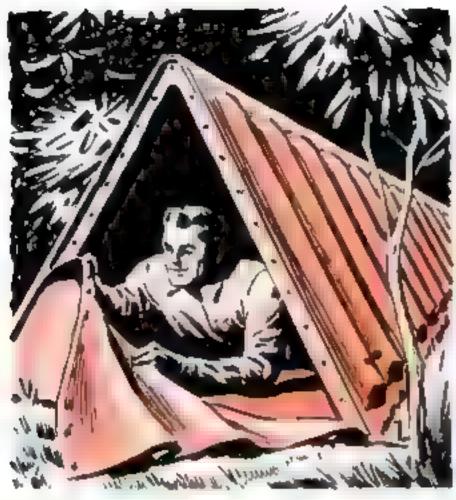
5 Pen Nib to Filter Ink. Unlike either regular or ball-point pens, this new writing instrument would transfer ink to paper by filtering it through the pores of a special metal point. It is said that capillary action would keep the thick, pasty ink from leaking but permit it to flow when the point touched the paper.



6 Knee Grip to Steady Plate. To keep your pienic lunch from skating off your lap, you'd grip the fold-down rim of this paper plate between your knees, Intended for drive-in restaurants as well as for pienics and parties, the plate would be precut and creased so the user could easily bend down the legs as shown.



7 Box to Meet Postman Halfway. A mailman wouldn't have to get out of his car to reach an off-the-road box that was mounted on a sliding rod. He'd carry a long hook to pull and push the box. Shde-out boxes would be useful wherever sidewalks, muddy ditches, or snow banks might keep him from driving up close to the post.



Air to Hold up Tent Walls. When pumped up, this combination sleeping bag and tent would support itself without stakes, and the inflated bottom would serve as an air mattress. The walls and bottom would be formed as a single piece; the sides would bend upward and zipper together at top. Deflated, tent would fold into a compact pack.



Ghain to "Remember" Your Key. This tuneful chain would have a cylinder and plunger between the key end and the part that hooks to your belt. If you should forget your ignition key when you leave your ear, the plunger would pull out of the cylinder and whistle a reminder. The parts would separate before the tug could tear your belt.



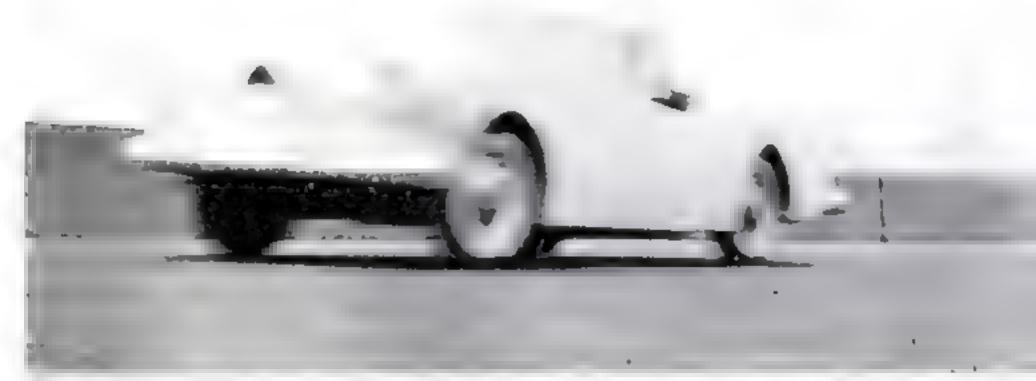
10 Bubble to Shield Tractor Seat. A clear plastic bubble that would close like a clamshell around a tractor operator would protect him from wind, cold, dust and rain, but would not reduce visibility. The rear hemisphere of this plastic enclosure would

be fastened rigidly to the frame of a conventional tractor. The front half, shaped to fit over the engine hood, would be mounted on rails. An operator would slide the front section forward over the hood when he wanted to get in or out.

U. S. potents on these inventions have been granted to: 1 J. T. Tucker, Oznacd, Calif., 2 P. L. McClarkey, Phoanizoille, Pa.;
3. B. Weiss, Flushing, N. Y.; 4. P. Schaper, Chicago, S. E. W. Rickmever, Prospect Heights, Ill.; 6. D. J. Olson, Minneapolis;
7. A. H. Kuschak, Bristol, Conn., 8, B. L. Kreaser, Dencer, 9. G. H. Riviere, New Iberia. Le.: 10. G. P. Base, Idalou, Tex.

Plastic Kaiser Shows Its Sporty Ways

A seductive murmur from the exhaust is the tip-off to an acceleration and cornering performance worth experiencing.



With its modest 90 hp, the new Kaiser Darrin sports car gets under way surprisingly fast.

By Wilbur Shaw

IT'S the next thing to blasphemy in the beret set to taint the tires of a sports car by setting them down on a saucer race track, but to give the Kaiser Darrin 161 a whirl. I had one deposited for me the other day at the Indianapolis Motor Speedway. It was the handiest place I could think of where I could open it up without greetings from a traffic cop.

Willys, now a subsidiary of Kaiser and the actual manufacturer of the Darrin, has attempted no legerdemain with this car. It is powered with the company's 90-horsepower F-head engine, and has a standard three-speed transmission backed up with an overdrive unit, Its axle ratio of 4.55 is designed more for acceleration than high speed.

Sports-car drivers want a car that accelerates well, has a commendable top speed and, above all, "corners" well,

The Kaiser Darrin was entirely tractable in hard right-angle turns on dry pavement at an indicated 55 miles an hour. It began "breaking loose" on all four wheels just beyond that speed. This was with the rear-wheel "dig" provided only by high gear. It was here, in pulling out, that the axle ratio counted. On rough footing the car began coming un-



A nice weight balance between the axles keeps the side sway in cornering to a minimum.

stuck from the road about 10 miles an hour earlier.

Before seeing what the car would do flat out, I checked the speedometer. Its error was about normal—3.7 miles an hour on the high side at an indicated 60 m.p.h., and just over six m.p.h. at 90. With a passenger aboard, top speed in third gear was an indicated 90. At that pace the tachometer in the instrument cluster registered 5.200 r.p.m. Top speed in overdrive was only slightly better—95.

Top speed in second gear was an indicated 70 m.p.h., with a tach reading of 5,800, and that in first gear 40 m.p.h.,

DUE TO THICKNESS of material necessary for strength, plastic bodies aren't so much lighter than steel ones. The Darrin's weighs 300 pounds. Total weight is 2,175.

with the tach at 6,500. The little F-head engine revved up amazingly high.

All speeds were averages of runs with and against the wind.

Here are the average acceleration times:

Zero to 30 m.p.h., using first gear only: three seconds.

Zero to 40, using two gears: 7.5 seconds.

Zero to 50, using three gears: 11 seconds.

Zero to 60, using three gears: 14.7 seconds.

Time to the quarter-mile from a standing start: 19% seconds.

Measures Up to European Sports Care

Esthetically, Darrin has done himself proud in the 161. (The designation is taken from the piston displacement.) The car can be stacked up against anything Europe has to offer in sports cars

The Kaiser Darrin is the first massproduction U. S. sports car of this era-It's being made by Willys, along with Willys, Kaiser and Jeep, because the Kaiser people have fused all their automotive interests under the Willys manufacturing name. The "Darrin" comes from Howard A. Darrin, the custom-car designer who styled the job.

The car I drove was one of only 2,000 that Willys will make as a first and possibly only batch of plastic-and-fiber auto-



RIGHT HALF OF DASH is covered by a crash pad. All the trun, including that on the seats and folding top, is of embossed plastic cloth.

REAR DECK LID is split between two compactments one for the top when lowered, the other for loggage Unly two molds are used to form main body structure.

TRICK SLIDING DOOR disappears note the funder when open but closes flush with the body metal. The frame is a modified Henry J's.

mobiles. When they have been manufactured and sold—at \$3,668 a copy—the company will stop and look at the market. Chevrolet and Ford, the only other U, S, companies making production-line sports cars, are being equally cautious.

The prices on these cars are high not only because relatively few are being made, but also because plastic bodies are expensive to manufacture. Until they learn a faster way to do it, bury the myth that plastic cars can be turned out of molds as rapidly as cupcakes.

It's no great chore to mold the Darrin body, though it does require more manhours than a steel body. The plastic is laced with fibers, in a steel or aluminum mold, and forced into shape like a felt hat, under heat and pressure. But then the problems start. Plastic pieces have to be cemented together, often bolted.

Finishing problems are complex. As the stuff comes from the mold, it has imperfections. That requires patching, and the plastic requires time to cure.

Slow "Crumple Rate" Means Safety

Yet the stuff must have a terrific capacity for absorbing impact stresses. In one instance a Darrin unexpectedly encountered a truck at a blind intersection at 40 miles an hour. The car wasn't much to look at after the dust settled, but the driver walked away unscathed. He was saved by what engineers know as the slow "crumple rate" of the body material.

Plastic bodies are also excellent sound dampers. They filter out extraneous noises. That's one reason why the seductive tailpipe music of the Kaiser Darrin comes through so clearly, as deep-toned as any sports-car lover could ask. END

FACTS ON KAISER DARRIN 161

Model: sports car.

Engine: 6-cvl., F-head in-line 90 hp at 4,200 r p in; compression ratio, 7.6.1 piston displacement, 161 cu. in., piston travel (in feet per car mile at 20 m p h.), 2,101, bore and stroke, 3,125" by 3.5", crankshaft bearing surface, 30,14 sq. in., torque, 135 fb.-ft. at 1,600 r.p.m.

Weight: 2,175 lb. (without gas and oil), per hp., 24.1 lb.

Transmission: 3-speed manual shift; rear-axle ratio with overdrive, 4.55:1.

Steering ratio: 24:1; radius of turning circle, 17%'.

Effective brake-lining area: 178 sq. in.

Springs: front, coil; rear, semi-elliptic.

Outside dimensions: height, to highest bow of top 50.8", to base of windshield 36"; over all length with bumpers and guards, 184"; width, 67.5"; wheelbase, 100", overhang, front 35", rear 49"; tread, front and rear, 54".

Inside dimensions: scat-cushion widths (total), 50.6"; leg room, 46.8"; headroom, 35.6"; scat height, 9.8"; vertical distance, steering wheel to scat cushion, 5.2"; scat adjustment, horizontal 5", vertical 0".

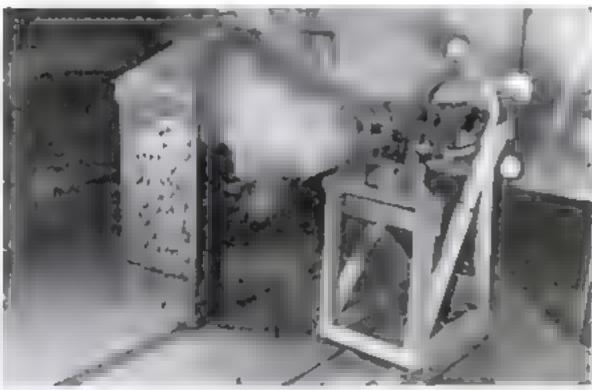
Tire size: 5.90 by 15.

Price: \$3,668, Toledo, Ohio.

Racer Takes Speed Trials Lying Down

THE Flying Deck Chair is what they call this superstreamlined motorcycle now trying for speed records in Germany. It is so low that the driver-designer—a bearded six-footer named Gustav Adolf Baum—pilots it while lying flat on his back.





New Aircraft Cannon Shoots Like Six-Gun

THEY'VE modernized the old six-shooter into the fastest automatic weapon U.S. forces now have. That's the new M-39, shown at left blasting away on a Ford test range. It uses the revolver principle to fire 20-mm, shells, Developed from a German design, the gun was tested in combat in Korea. It is credited with destroying seven MIGs.

Water-Cooled Plastic Pillow Has Notches for Your Nose

Before inflating this plastic pillow, you pour in some water. By conducting heat away from the body, the pillow cools the fevered brow on hot nights or soothes an aching head.

The odd notches cradle your head and let you breathe in any position. Better Sleep Co., New Providence, N.J., makes it.

Southpaw Can Wind This Watch

A LEFT-HANDED watch is no gag any more. Southpaws can now get wrist watches with the stem at nine o'clock instead of



three, so that they can be worn on the right and wound from the left. They are sweep second Hamiltons with faces rotated a half turn.



Science Licks the Grasshoppers

Death for 500,000,000 grasshoppers in 15 minutes descends in an aldrin mist from a DC-3.





Many-tentacled spraying machines seek out and kill the marauding insects in small fields.

Victory over an ancient enemy now seems assured, as planes and machines attack with new, deadly chemicals.

By B. F. Sylvester

ONE of mankind's oldest foes is launching a savage attack on the western two-thirds of the U.S. this month.

Grasshopper hordes for weeks have been gathering in fence rows, along weedy roadsides, in ditch banks and under the surface of waste and idle lands.

Their campaign plans are known. Primary targets for this year are central New Mexico, southern Colorado, northern Wyoming, eastern Utah, southern Oregon and central Idaho, Secondary targets include other parts of Colorado, New Mexico, Oregon and Utah, plus Arizona, Nevada, Montana, Nebraska, Wisconsin and single fields in Missouri. Skirmishes are

scheduled, in all, for some 22 states. But the grasshoppers are in for a stag-

gering surprise.

This year, armed by science, the U.S is ready for them with new weapons that will smite the hoppers on the ground and blast them from the skies. We have

chemicals that to the insect world are the equal of H-bombs. Furthermore, we have the means to deliver them to targets that are already pinpointed, down to the last farm in Iowa and the least sus-

pected mountain slope in Colorado. Every county agent in the target states has a map showing where the egg beds are. So does every farmer who has asked for one.

Thus victory looms in one of the longest wars the world has ever known.

Even before men began writing history, grasshoppers were periodically stripping the land, forcing grazing animals to hunt grass elsewhere and carnivorous animals to follow the fleeing rabbits, mice squirrels and birds. The records of ancient Greece, Rome China and Israel contain

many a grim account of grasshopper plagues.

"The land is as the Garden of Eden before them, and behind them a desolate wilderness, yea, and nothing shall escape them," mourned the Prophet Joel.

The American Indians suffered, too;



THE FACE OF THE FOE looks smug, perhaps because the battle went his way so long.



Scenes of historic defeats in the Grasshopper War



CLOUDS OF HOPPERS attacked the peoples of Biblical times (left, above), leaving help-less tribes of men to starve and die.

years after it happened, an old chief told of a migration of grasshoppers that drove his tribe out of northwest lowa in 1833 and left the countryside as black as if it had been swept by a prairie fire.

Destruction from the Sky

In July, 1874, a fantastic swarm of the insects-their wings grown as much as a half-inch longer than normal, their nervous systems stimulated by a mysterious impulse that periodically urges them to get up and go-dimmed the daylight over Colorado, Nebraska, Kansas and western Iowa. One flight was 300 miles long, 100 miles wide and a half-mile high, and was estimated to contain more than 120,-000,000,000 grasshoppers. The noise of their wings sounded "like a rushing storm." They dropped into the fields and ate every green thing They devoured potato vines and followed them into the ground for the potatoes.

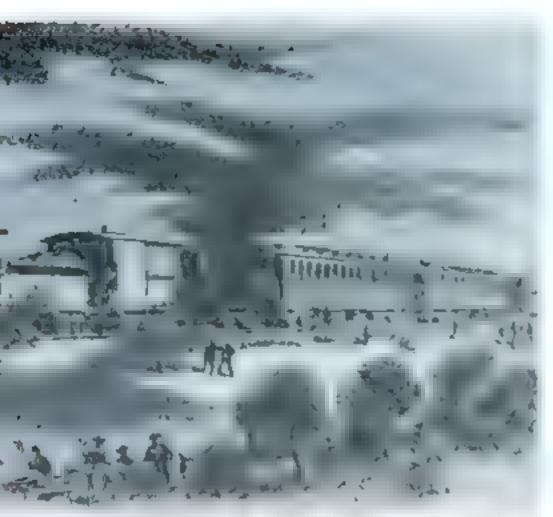
A farmer's wife had started for town in her wagon with tubs of fresh butter, covered with towels. A great cloud of the insects appeared in the sky. The frightened horses balked. The cloud descended, attacked the wagon and ate the

managed to whip her team into frantic action and fled for home, where she tried to save her cabbages by covering them with old clothing. The insects ate the garments and even chewed up the shades on the farmhouse windows Weather-beaten buildings soon looked as if they were made of new lumber. Green corn was bent to the ground by the weight of the grasshoppers by day. Branches in the treetops bent and broke under them at night.

The Futile Flood

In the wake of this historic attack, a soothing flood of inventions intended to prevent its recurrence poured into the farm states: the Hetzel Burning Machine, the Drum Locust Crusher, the Atwood Sulphur Fume Machine, the King Suction Machine, the Canfield Pan, the Anderson Coal Oil Contrivance, Mr. Thompson's Net, and others, all equally ineffective.

The hopper 'dozer came out about the same time. Drawn over the fields, it collected hoppers by the hundredweight to be sacked up for hog feed.



TRIUMPHANT IN DEATH, billions of grasshoppers that scourged four great U.S. farm states in 1874 even balted trains with their bodies.



SWATTING THE PESTS, a tactic that has proved futile for at least 4,000 years, was still this Nebraska farmer's only resort in 1876.

Poison bait, introduced in 1885, went west by the carload, But not until the last three years has science armed farmers with means effective enough to turn the tide of battle. Even now, along a belt stretching from Africa to India, grass-hoppers threaten the food supply of one-fifth of the world's population. Under the Point Four Program, the U.S. is helping to fight the greedy insects on that distant front

Today's weapons are chlorinated hydrocarbons, poisons of both the contact and internal varieties. DDT was not effective against grasshoppers. They are it with relish. They began to get a disagreeable and fatal mouthful, though, when the chemists followed it up with hexachlorocyclohexane and then chlordane. After these came toxaphene, heptachlor and aldrin (its chemical name is two lines long).

Aldrin is so powerful that two ounces of it will kill virtually all the grasshoppers on an acre of land and any others that enter that territory for a week afterwards.

Newer and still more terrible, with an even longer chemical name, is dieldrin,

a half-ounce of which will do as much damage to grasshoppers as two ounces of aldrin.

This year, as the grasshoppers take wing, American farmers are able to mobilize 5,000 planes against them. Government DC-3s will smash the bases of potential insect flights. Ranchers will hire aircraft like the B-17 owned by two Nebraska brothers. It carries 12 tons of chemicals and kills the grasshoppers on 3,000 acres—a billion and a half, in a heavy attack—in 40 minutes.

Victory in Sight

On foot or from jeep or truck, the typical lowa farmer can spray the hatching beds on his land in 20 minutes. If some of the young insects escape to move into his crops, he can spray 200 acres from a small plane in an hour. When infested areas cover 5,000 acres or more, state leaders in the battle will organize large control units, their cost to be shared by the U.S., the state and the individual farmers.

"I think," Dr. H. M. Harris, Iowa state entomologist, confidently declares, "that the grasshopper is licked." END

No Deposit or Depositor Too Small for This Bank

ALL a member of the lollipop set in Geneva, Ill., has to do nowadays to see what's going on down at the First National Bank is step onto a red spot in front of window No. 5 and wave the long green stuff

From then on it's just click, swish, and a youngster is standing as tall as daddy, pushing his (or her) savings over the counter.

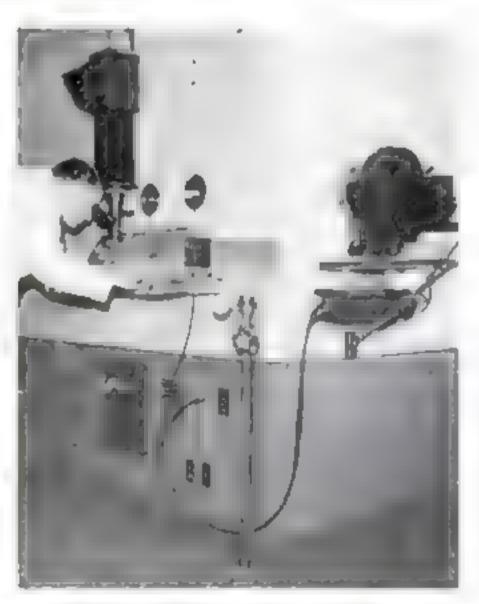
The secret is that red spot on the floor. It is a small elevator, controlled by teller No. 5 and powered hydraulically by machinery in the basement. A local firm made it from farm-equipment parts. It has a telescoping steel shroud—like a collapsible drinking cup—to make sure tiny toes aren't squashed.





Bandage Needs No Wrapping

The nurse above is applying a new tubular bandage, peeling it in layers from a cagelike contraption to fit it over the patient's head. The English maker claims that Tubegauze can be applied to various parts of the body in seconds.

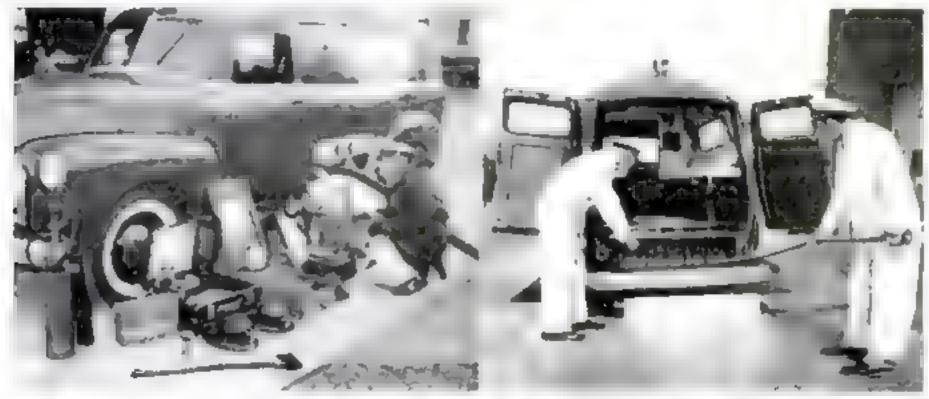


Hot Metal Studied from Afar

THE microscope goes to the specimen when it's a piece of "hot" metal. At Hanford, the radioactive sample is inside the cell above. An arc lamp outside (right) lights it, and a microscope, also outside (left), views it through a window.

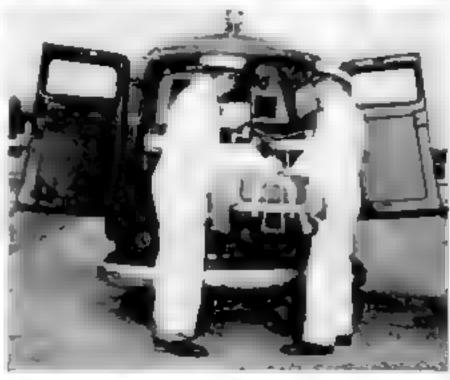
[7] POPULAR SCIENCE





Fire Truck Is Ambulance, Too

In Menlo Park, N. J., a two-man fire engine that can also serve as police car or ambulance investigates a blaze before the fire fighters make an all-out dash. Hoses coiled under the running boards pump 200 gallons a minute from built-in tanks or from hydrants. A bose above the rear bumper (upper right) pumps foam. Two bunk beds with space between for a stretcher let the truck double as an ambulance (right). Resuscitators, oxygen tanks and other gear (above) are stored in the cab. The Christopher Co., NYC, makes the FAPA truck.





Two Pistons in One Cylinder Power Imported Cycle



PARTIAL DAM separates pistons, but they share same combustion chamber and spark plug. Cutaway shows top dead center; plug has just fired. New charge enters crankcase.

GAS FLOW at bottom dead center helps show how this two-cycle engine gains efficiency: burned gases are swept out progressively, without need for usual deflector pistons.



BABY BROTHER is this 5.1-hp., single-piston job that gives over 100 miles a galion. A squirrel-cage blower cools it.

Ingenious engine in this small mail-order machine packs unusual punch for its size.

ANY day now you can get a motorcycle by mail and buzz across state on two or three gallons of gas.

Three new Austrian lightweights are in Sears, Roe-buck's stores and catalogues this season, two in the 175-cubic-centimeter class, weighing 256 pounds dry, and a third in the 125-cc. bracket at 147.7 pounds. They are made by Steyr-Daimler-Puch, Austrian motorcycle builders, but Sears would prefer that you call them just plain Puch, pronounced pooch

The bigger cycle, in either standard or de luxe trappings, will whisk you along at nearly 60 m.p.h., burn only one gallon every 86 miles, and take both you and a passenger up a 30-percent grade.

The muscle for all this comes from a 10.3-hp. double-piston engine coupled to a four-speed, sliding-

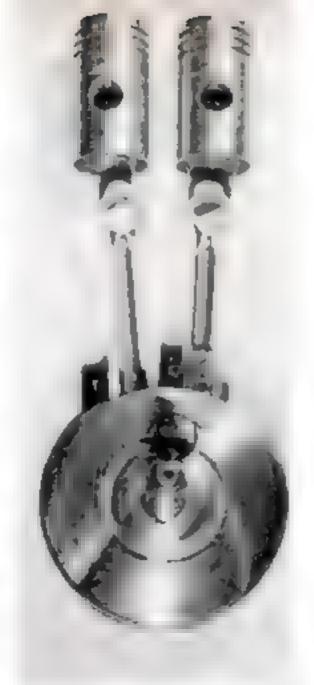
22 POPULAR SCIENCE

gear transmission. Its pistons work in two bores, joined at the top, that share a common finned cylinder. The intake ports feed one bore and the exhaust leads off from the other. The pistons, linked to the same crankpin, have identical strokes, but are connected so that one leads the other during part of the cycle, This provides unusually efficient scavenging of the exhaust gases. It delivers a high 0.95 horsepower for each cubic inch of displacement, almost double that of many auto engines.

Telescoping springs, oil-dampened, suspend both 16-inch wheels. Each half of the front suspension consists of a long helical spring plus an oil cylinder working through one set of damper valves. The rear fork, consisting of two shock absorbers, is a free-swinging pillar bolted to the cycle's strutless, sheet-steel frame. Almost half the rear fender is an integral part of this canopy structure.

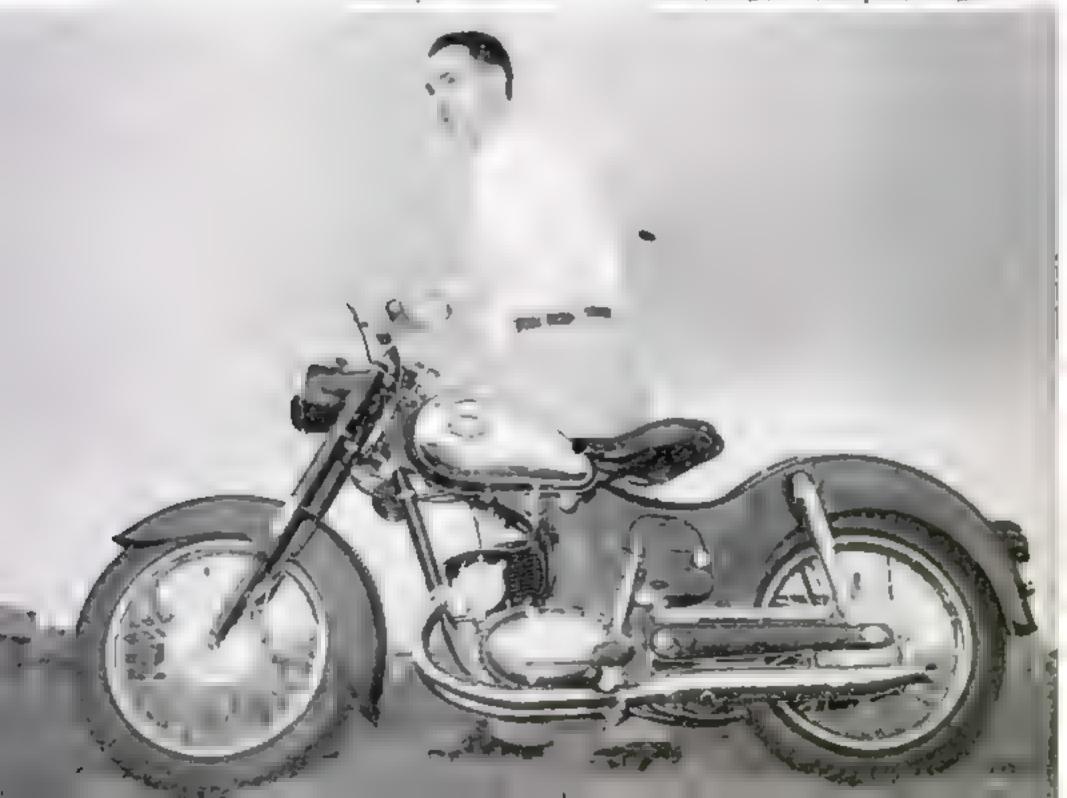
Dragging all three machines down to fast stops are oversized automotive-type brakes, finned for cooling, and applied by handle-bar grips plus foot pedals.

Sears decided to sell these small motoreveles because a motor scooter announced last year proved unexpectedly popular. The new machines will be serviced through the firm's scooter outlets. Delivered prices range from about \$300 to \$400.-Kenneth Wylie.



MAIN ROD, left, carries pivot for other. Both pistons have identical stroke but travel at different rates of speed,

To the casual eye, the new motorcycle looks like a conventional single of European design.





Egg-Crate Pads Quiet Radio Studio

Ecc-crate separators line the broadcasting room at the high school in Boone, N.C. Science teachers helped by students stuck 760 molded-paper pads to walls and ceilings, then anchored them with tacks. The local radio station's engineer says the unusual acoustic treatment gives the room broadcast quality equal to that of a big station. The school studio hooks up with station WTAR in Boone.

Educated Chickens Live in Solar House

This window-wall house is strictly for the birds. Facing south at Penn State's experimental farm, its Thermopane windows keep poultry warmer in winter, cooler in summer. An overhanging sunshade (shown extended) keeps direct rays from the double panes in hot weather.





This Furniture Grows Taller as Junior's Legs Grow Longer

THE combination desk and chest above grows with your child. To raise the level of the writing surface, you just pull out the telescoping iron legs and reset the locking pins (right, above). Three dresser drawers

at one end of the desk are topped with a cabinet with removable shelves and a built-in clothes rod. A magazine rack forms the other pedestal. The Darbyhte Corp., 467 Troutman St., Brooklyn, N.Y., is the maker.

British Fire Fighters Use Gas-Turbine Pump

Two men can cart this gas turbine around a plant for use as an engine or a pump. It needs no water, little lubricating oil, and is far from choosy about its fuel. It will run on natural gas, coal gas, sewage gas, gas from a blast fumace, as well as kerosene or gasoline.

Operating as a water pump, it can deliver 500 gallons a minute at 100 pounds' pressure. The Rover Co. of Coventry, England, maker of one of the first gas-turbine automobiles, is the designer.

home with Mama during a recent scientific meeting in Washington—it was the annual convention of the Society of Women Engineers. The children came along and played in a hotel nursery while their mothers met in rooms nearby, glancing in occasionally to check on their offspring.





Twin Trailers Link Up to Make a 100-Seat Auditorium on Wheels

WHEN its merchandising men tour the country, one company now sends along a showroom aboard two trailers that open and unfold to make a big auditorium. The facing trailer sides swing out and lock to

form an interior that seats 100 persons. Tucked in corners and on walls are a projection booth, three movie screens, a loud-speaker system and spotlights. Boyertown trailers make up the Armstrong motorcade.

to see them make...



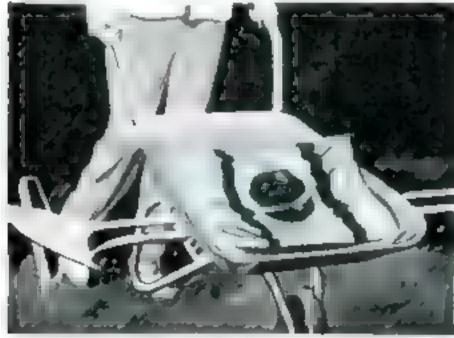
GOVERNMENT POSTCAROS printed in long streps and perforated so they could be torn apart for mailing. Typing notices would be quicker.—Mrs. Joyce Mosby, Darby, Pa.



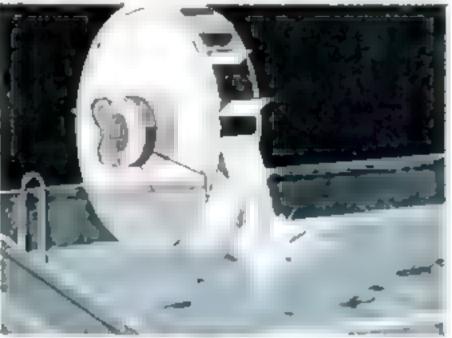
CANNED GASOUNE, sold in sealed gallon time like antifreeze. Two or three could be carried safely in a car trunk for emergency use.—Frederic Carroll, Dallag.



A CASH REGISTER with a special key that would ring up NO SALE and at the same time set off a burglar alarm at a protective agency.—Murroy Sidlin, Baltimore.



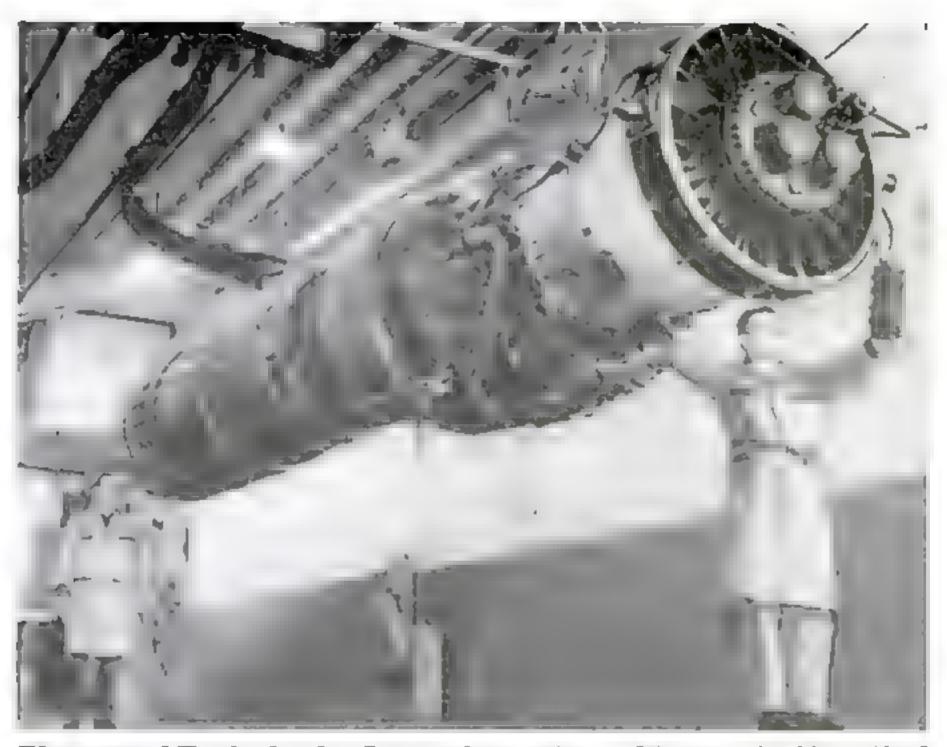
A DOUBLE-DECKER WHEELBARROW, The lower deck could be a shallow tray or a rack for tools, leaving the upper deck clear for materials.—Robert Chambers, Hewitt, N.J.



AN AQUARIUM FISH FEEDER that would do a catering job when you were on vacation. A bucket wheel with timer could dump food at preset hours.—P. Hoff, McKees Rocks, Pa.

Everyone has his own pet idea of a gadget that he would like to see in general use. The five ideas illustrated above were suggested by Popular Science Manthly readers. What

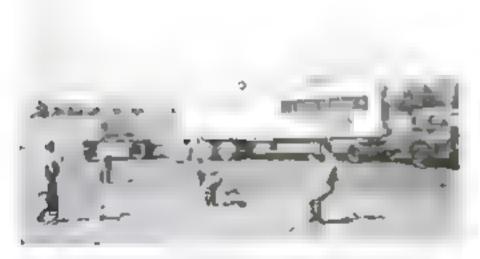
is years? We will pay 25 for each one published. Please use government postcards only. Write name and address clearly. Contributions cannot be acknowledged or returned.



Elongated Turbojet for Record-Breaking Fighter Is Unveiled

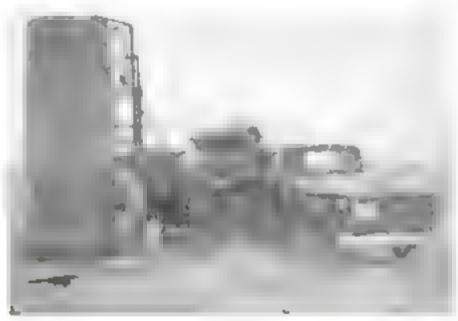
This long hunk of machinery is what sped the F-100 Super Sabre to a world speed record of 755 m.p.b. It is the J-57 turboict, shown in one of the first photos

released. The Pratt & Whitney power plant provides added power from its afterburner, an exhaust extension that can burn extra fuel when the pilot needs a boost in thrust,



L. A. Ready with Radio Trailers

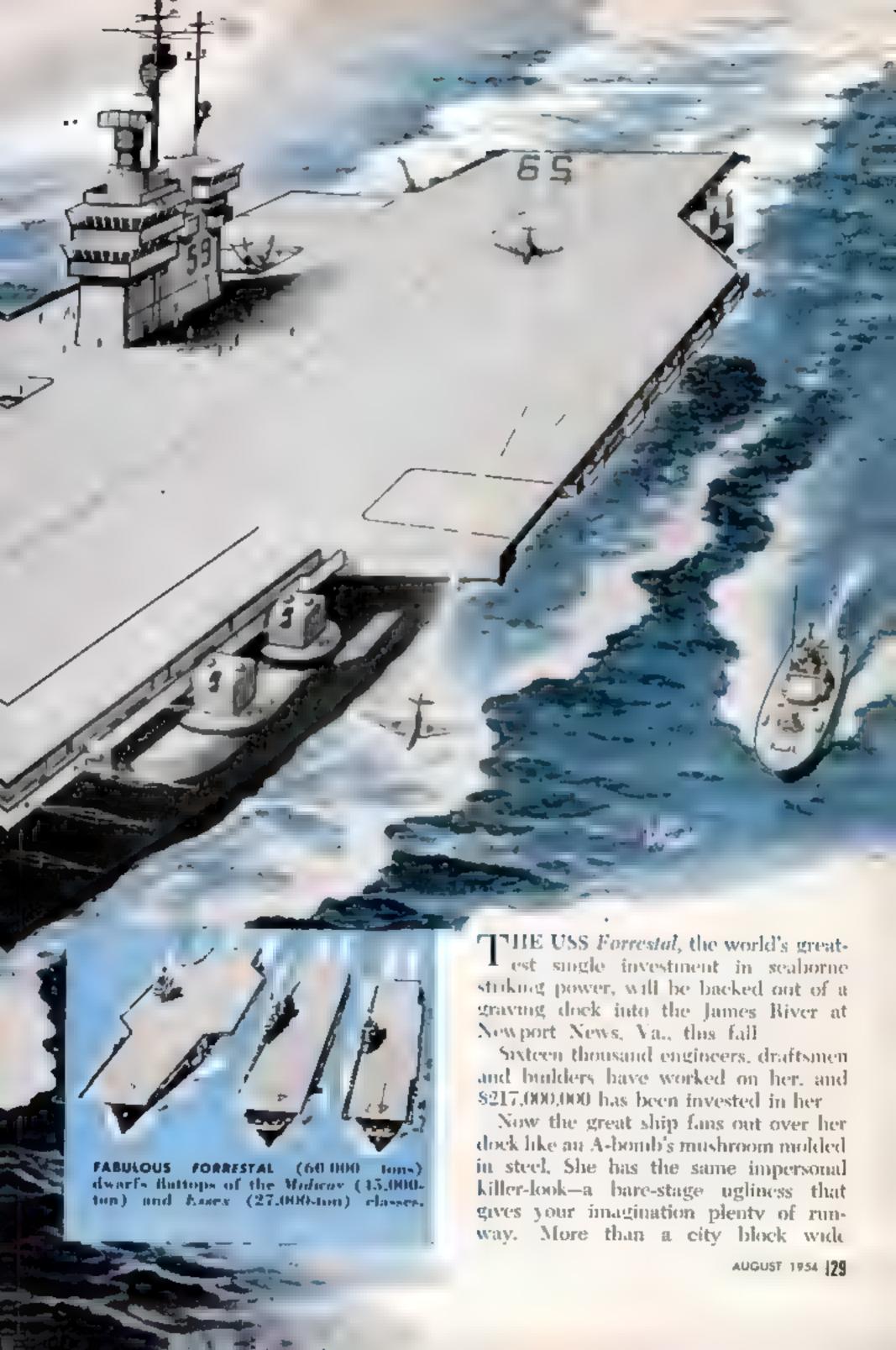
Los anceles has three of these trailermounted communications centers for civil defense. They tie in with 150 radio cars, 100 walkie-talkies and 60 fixed bases. A "pup trailer" hauls a generator to power equipment in the big Fruehauf trailers.

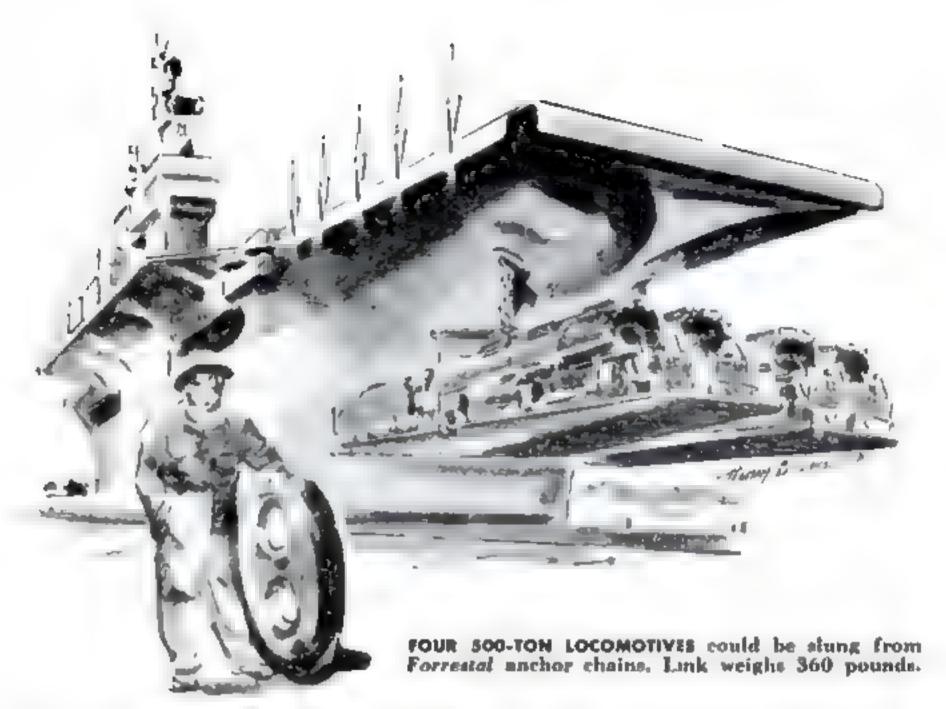


Truck Makes It Rain-a Little

THE rainmaking truck above helps show which kinds of pasture will soak up rain the best. The cylindrical structure sprinkles two-foot patches of land so that Department of Agriculture scientists can compare different types of soil and grass.

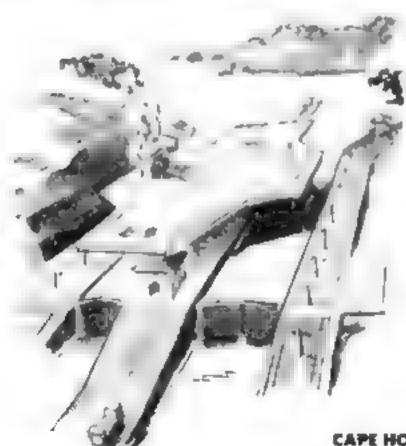






(252 feet at her flight deck) and 1,039 feet long, she is only seven feet shorter than the Chrysler Building is high.

Picture 100 Santa Marias moored bowsprit-to-sternpost and portside-to-starboard in the form of an elongated cross. Remove the Forrestal's control island and you could stow the lot of them aboard her flying deck.



Or stand on the edge of that floating airfield and look down. The floor of Graving Dock 12 is almost a hundred feet below you. But you'd never guess it. This huge concrete basin, which could wrap up such luxury liners as the *United States* with ease, is now blanked out by a hull that's busting out all over.

Crones Trapped by Ship's Bulk

They had to clear Dock 11, beside her, to make way for the sponsons that support her flight deck. And the big traveling cranes that lifted 80-ton prefab assemblies aboard for welding are now trapped at the land end of their own handswork. Crawler-cranes on the Forrestal herself must handle the control-island units.

That island will be five decks high. With its stubby, hinged masts raised, it would tower 60 feet above the underflooring of the Brooklyn Bridge. A full-scale mock-up of each deck was roughed

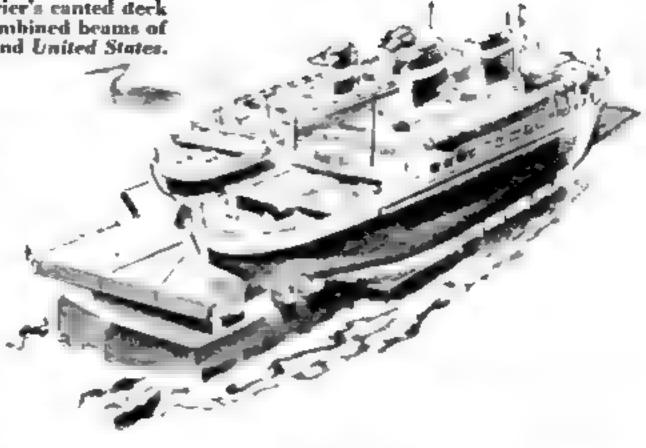
CAPE HORN DETOUR awaits Forrestal—its flight deck would span Panama Canal's twin locks.

OVER-ALL WIDTH of the carrier's canted deck is 58 feet more than the combined beams of the luxury liners America and United States.

out in the shipyard's joiner shop before cutting torches went to work on girders and sheet steel. Except for soundproofing, these mock-ups are complete, down to the last simulated intercom phone. An unimportant detail? Not when you're plotting cable for 400 dial sets and 1,900 sound-pow-

ered battle telephones aboard the ship.

Looking out through the pagoda-like windows of the primary flight-control mock-up, you can almost trace the blur of A3Ds streaking down the four long



ribbons on the deck that will be the only visible sign of the Forrestal's steam catapults.

The Navy is coy about those "cats." Nobody's saying how the grooves are buttoned up to prevent steam leakage, for instance. But they are tried and proven rigs, able to whip the biggest carrier-based attack planes into the blueup-yonder with a bomb load equal to the whole weight of a Navy plane in 1942.

Steel Decks for Fire-Breathing Jets

There's no such hush-hush about the functional design of the deck, It is made completely of steel. The fir originally used on U.S. carrier decks was better in some ways-more resilient and less slippery. But neither fir nor experi-



mental teakwood could take the hot breath of jet afterburners. The Forrestal's "tin roof" can. What's more, it will turn a kamikaze into the kind of briquette you can sweep up with a broom.

The carrier's amazing overhang is the direct result of the Navy's success with a canted deck on the flattop Antietam. In the past, an inbound plane that had lost its flying speed and missed the arresting gear on the aftersection of the

deck, plowed into a protective barrier if other planes were parked up forward.

Now that hazard is gone. They've widened the mid-section of the Forrestal's deck, and set her landing strip on a 10.5-degree diagonal. Thus a plane whose hook fails to engage any of the six hydraulically cushioned pendants (cables) strung across the runway will have a clear track over the portside of the ship and out to sea again, where it can square off for another try.

The canted deck has other advantages. The old axial, or center-line

runway is still in business up front, offering what amounts to a completely independent airstrip. With catapults on both runways, the Forrestal will be able to toss her big jets aloft with the dexterity of a juggler, cutting the launching time for her squadrons in half. Or she can, when necessary, launch one flight and recover another at the same time.

Dumb-Waiters Will Serve Up Planes

The platform overhang also puts her four big aircraft elevators where they belong—out on the edge of the deck—not in the middle of her runways. These oversize dumb-waiters will shuttle between the platform and three 25-foot-

high hangar bays on the deck below it.

The huge proportions of the bays you could put five basketball courts in any one of them—are typical of the Forrestal's dimensions.

Her 3,500 crewmen will use nearly twice as much water as the eight big boilers that feed her main turbines. To supply both needs, her water tanks must store nearly 400,000 gallons. Half of it will pass through her distillers, daily.

Although one man can operate all of the control devices in each of ber machinery rooms, the Forrestal's power plants are the largest ever put in a ship, To carry 200,000 horsepower from the turbines back to the screws, machinists at Newport News turned the world's biggest shafts. The longest of the lot has a reach of 400 feet. Each of the five-bladed bronze propellers is 22 feet in diameter. They will fan the Forrestal along at better than 30 knots.

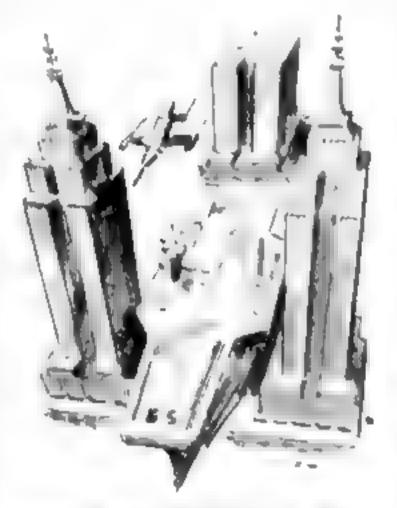
Your guess is as good as any layman's when it comes to speculating on her secret weapons

and special equipment. At Newport News they'll only tell you what your own eyes can see—that turrets for fiveinch guns are not yet outmoded.

Those who say that the H-bomb has written "finis" to big ships like the Forrestal like to use the phrase "too many eggs in one basket."

The men who designed the Forrestal, and two sister ships to follow (the Saratoga and CVA-61, as yet unnamed) have a pat answer.

"There'll be plenty of eggs," they agree. "The kind that a basket like the Forrestal may be able to protect and deliver better than a land-based setting hen."



MENT for 2½ Empire State Buildings will blast tropic heat from erew quarters and most working space for comfort aboard the Forrestal.



Safety Belt Stops Tractor

If Trus farmer falls off his tractor—a common, often fatal accident—he won't get plowed up. His fall will yank out of his belt a plug wired to the ignition, killing the engine and stopping the tractor. The Dooley Co. of Moline, Ill., manufactures the safety belt.



Dairymaid Milks from Swivel Chair

Muxing 30 cows an hour without moving is easy for this dairymaid. The cows walk around her while she swivels about in the pit to milk, clean or feed them as they move along. Hervey Research Development Corp., Geneva, Ill., makes the equipment.

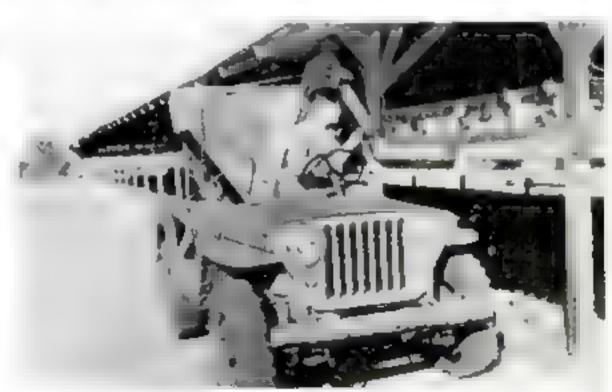


Gigantic Eggbeater Harrows Soil

GIANT rotating wheels dig slanting teeth into the soil to harrow and level fields at the E. S. Thompson ranch at Strathmore, Calif. The teeth, welded to the tubular framework, make the tool rotate as it moves forward.

Hens Get Quick Snack from Hopper on Jeep

Culif., doles out meals from a jeep-mounted hopper to feed 4,500 chickens in 4,500 cages in less than a half-hour. A gasoline-powered auger pushes feed across the bin and a paddle elevator lifts it to a flow spout. A strap on the driver's leg controls a clutch that regulates flow to the feed troughs.





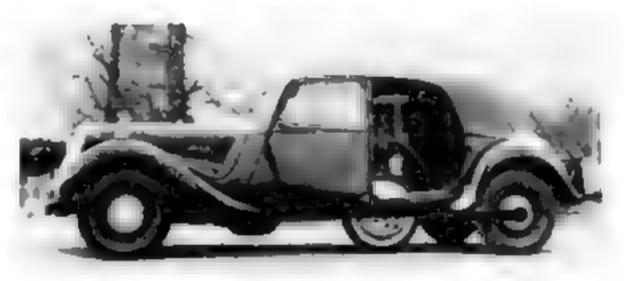
Slot Machine Rents Cart as Robot Redcap

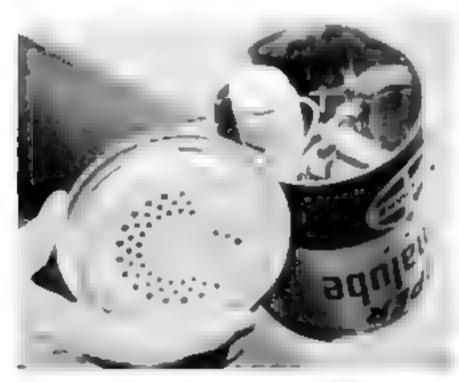
quarter in a slot, this young lady gets a baggage cart for the hike from train to taxi. At the station exit she'll park the cart in another rack and get a refund of 10 cents

Two railroads are trying out the selfservice carts to supplement redeaps at Boston's South Station and at Penn Station in Pittsburgh.

Car Skids on Purpose to Make Roads Better

THAT fifth wheel helps British engineers measure skids
while their car goes straight
and true. The extra wheel is
simply mounted at an angle,
so that it is always skidding
It is used in experiments on
skid-resisting road surfaces.





Tin-Can Phonograph Sells Oil

Next time you stop for gas you may be handed a talking can to hold while you wait. A tiny phonograph run on flashlight batteries, it is set off by a button and sounds off with a sales pitch for Permalube oil through a speaker in the bottom.



Quick Camera Gets Smaller

HERE'S a squeezed-down model of the camera that prints its own film as you shoot. Coat-pocket size, the new Polaroid makes eight 2%-by-3%-inch pictures from a roll that costs \$1.19. The camera costs about \$70, the clip-on flash gun \$13.

34 POPULAR SCIENCE

Let's Put Some Science in Science-Fiction

Well-known science writer prods modern cosmic yarn-spinners in the seats of their space suits with some pointed pointers.

By John Lear

BESPECTACLED small-fry inhabitant of a daily newspap-

er comic strip recently appeared in print with his head embubbled in a space helmet and a ray gun clutched in his hand.

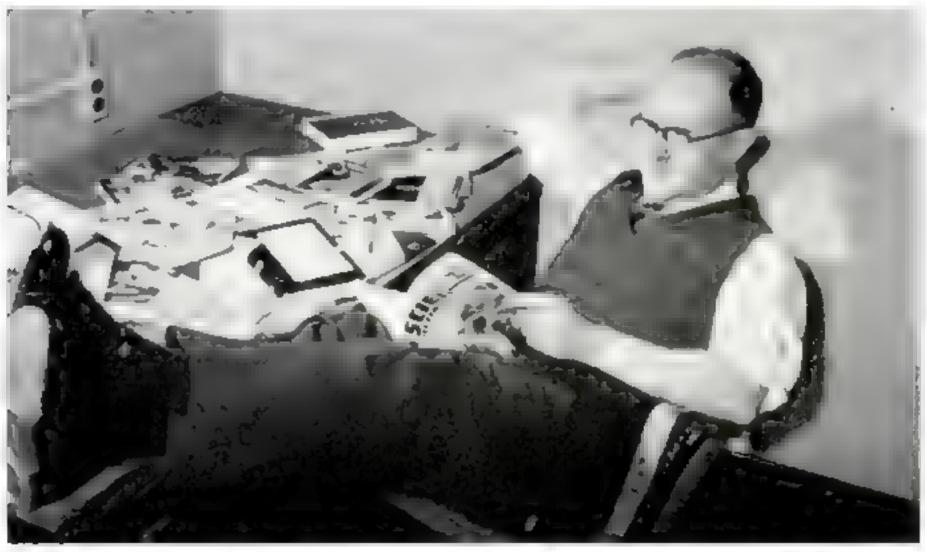
"Seen any bad men in th' gulch today?" he inquired of a female caricature. "I aims to put law and order in these here parts!"

"You're mixed up, Stuart," the gal retorted. "You're dressed like a space-man, but you talk like a Westerner!"

The self-appointed spokesman of order stiffened his neck. "It so happens, ma'am," he cried, waving his pistol, "that I'm from out yonder in WEST MARS!"

The cartoonist who sketched that episode must be a reader of science-fiction. Certainly he achieved, in a few deft strokes, the most succinct expression I have seen or heard of the state of literary schizophrenia in which SF writing is bogged today.

On TV, Captain Video's space rangers amuse themselves, while riding rockets between the planets, by dialing movies of the Old West on their remote carrier beams. Perhaps this unscientific



JOHN LEAR, the writer of this article, holds four top awards for excellence as a science reporter: the Sigma Delta Chi Award for distinguished public service, the Headliner's

Award, the Westinghouse Award of the American Association for the Advancement of Science, and the Albert Lasker Award for distinguished writing in medical journalism.



sandwich of space-time may be excused on the ground that the earthbound watchers of the show are kids. But what about the following supposedly grownup book review in *The New York Times?* I quote verbatim:

The Earth of the far future is plagued with many problems, what to do about its conquerors, the "Spacers," descendants of the men who settled the stars; where to employ people thrown out of work by robots; why mankind prefers to live in a few gigantic megalopoles; and how to discover the murderer of an eminent Spacer. It is with this last problem that Lije Bailey, detective, is concerned. If he fails, he loses his rating, an almost-fatal misfortune in his overcrowded world. Moreover, be must cooperate with a robot Spacer detective while solving the crime. Life learns more than the identity of the murderer: he learns how Earth can save itself.

Is Lije Badey very likely to make such a sweeping discovery while chasing a murderer? Does the writer who concocted such a plot show any respect for the scientific method of inquiry? How in the name of all the galaxies can any logical brain misuse the word "science" by calling Lije's Hollywood nightmare science-fiction?

SF Editors Repelled by Own Vacuum

I would enjoy, and I am sure most readers of POPULAR SCIENCE MONTHLY would enjoy, fiction bearing some relation to science as it is practiced on Earth. Creative literature is, after all, only an imitation of life, Its reason for existence is to mirror man's accomplishments, hopes and fears. But the mirror of science-fiction today is rapidly losing its quicksilver. From its barren glass the sterile emptiness of space stares so darkly that even the editors of SF magazines are repelled. H. L. Gold, of Galaxy, wrote a double-header editorial in his February and March 1954 issues to this effect.

"Lock, fellows! It may not be nec-



essary to go out to the stars just yet to find living space for our excess populations. There's a lot of room left right down here on the Amazon river."

The Moon-Mars-and-Venus rocket jockeys will argue, of course, that people ought to know about space because Albert Einstein proposed space stations to defend democracy in the atom age. They have a point, But shouldn't people

......You Got a Point of Order?.....

John Lear's acid remarks on today's science-fiction writing will, the editors of PSM suspect, cause some astral addicts to reach for their ray guns, crying, "Blast off!" Others may wish to present him with an impervium-plated

medal. For the five most interesting letters, of 150 words or less, commenting on this article, and received by Sept. 1, PSM will pay \$25 each. Address: The Editor, POPULAR SCIENCE MONTHLY, 353 Fourth Ave., New York 10, N. Y.

also know, and know first, about the strategic power vacuum of the Canadian Arctic? We can't do much with the North Star if we lose the North Pole.

This is not to imply endorsement of SF writers playing cops and cowboys if they play Royal Canadian Mounties and resideer herders instead of chasing rustlers through the gulches of the Milky Way. I think SF should abandon completely the worn-out Wild West and private-eye themes. To put it bluntly: let's have some science in science-fiction!

By calling themselves writers, the signers of SF stories forfeit any right to be excused from the sweaty digging for facts and the still sweatier travail of disciplined imagining that might enable them to depict (as Jules Verne did with his submarines and flying machines) wonders that will sound plausible to us and commonplace to our children.

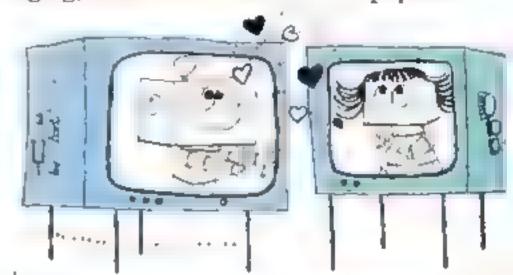
No Brain Waves for Ralph

It is fashionable for current SF practitioners to sneer at Hugo Gernsback's old SF classic—Ralph 124C41+—as "unreadable." But to me, Ralph is considerably less of a cardboard character than most of the tipsy space sailors I meet in SF today. At least Ralph's romance, though steeped in intellect, was mature. He didn't try any of the now-popular adolescent tricks like remote-controlled seduction through aphrodisiac brain waves.

Gernsback was wordy. He was Victorian. His story, however, moved logically. And his science, though wondrous, rang with possibility. It is not enough to remember him as father of modern SF. His sensitivity to significant trends calls for critical study in the light of science's implacable encroachment on all human affairs.

Ralph first appeared in print in 1911.

Yet through him Gernsback fancied the coming of TV, radar, simultaneous multilanguage translation, man-made rain, transatlantic airplanes, helicopters, cold light, night ball games, automatic packaging, the use of sound as a physical



Why not remote-controlled romance?

force, titanium, microfilm, rayon, artificially accelerated plant growth, glass brick, guaranteed bank deposits, directed research in science, and government domination of certain areas of research under a blanket of secrecy.

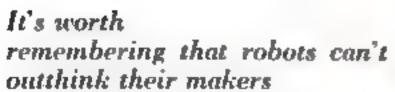
Incredible prophet that he was, Gernsback had no monopoly on the art. In the last decade, Robert Heinlein duplicated Ralph's panoramic vision in narrower compass with more immediate and spectacular results. Heinlein predicted not only the A-bomb but its use to annihilate a city to end a war.

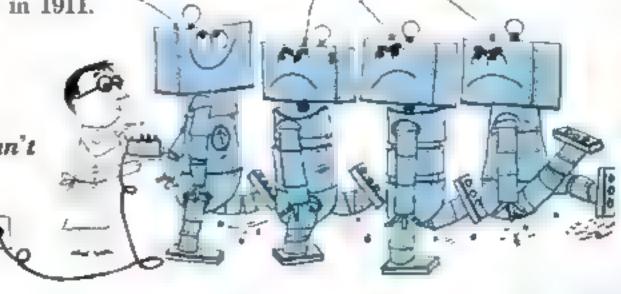
But where are Gernsback's and Heinlein's disciples? Why is their method so rarely followed in science-fiction?

The mailman brings me seeds for scientific speculation every day.

An atomic locomotive is now feasible. Railroads have been the subject of adventure stories for years. Trains will be vastly different when engines re-

[Continued on page 244]



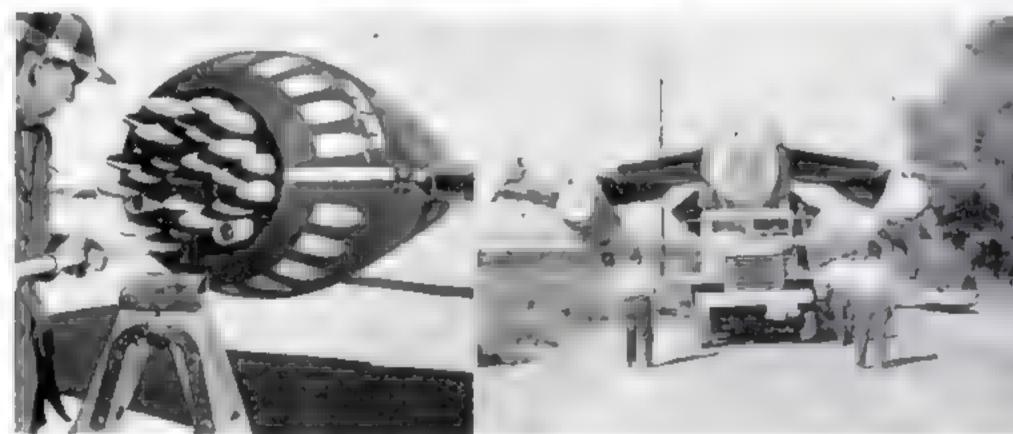




Radar in Tail Aims Bomber's Robot Guns

FAIL guns that are fired at targets automatically tracked by radar are now part of the armament of the Air Force's Boeing B 47F. Stratojet bomber. The entire tail-turret system is remotely controlled.

This is how it works: In danger areas the rad or is switched to "search," When it picks up an attacking plane, it begins supplying a computer with information for the 20-mm, guns. When the target is within range, the guns are fired. Two guns are mounted in the full-swiveling turret,



Deadly Egg Spews Out Rockets

A HONEYCOMB of 52 rockets is carried on each wing of the Air Force's Northrop Scorpion fighter. The honeycombs, which look oddly like the egg-shaped nacelle housing an airplane's air-cooled engines, can be fired in salvo. A hit by even one of the 2.75-inch rockets can down a bomber. The Scorpion can climb higher than nine miles.

Airpiane is Moved Like a House

It was exactly like moving a house through the streets of Los Angeles when a Douglas attack plane with its wings on had to be trucked from the factory to Edwards Air Force Base, 171 miles away. Telephone poles, traffic signals and roadside trees had to be removed and replaced afterward. The speed? Five miles an hour.

Three-Winged "Flea" Flies 100 Miles an Hour



A TRIPLANE that its builder, George Frisbie of De Pere, Wis., calls "The Flea" has only a 20-foot wing span and flies at a speed of about 100 miles an hour. The little plane measures 15 feet in length. Frisbie has test-flown it under the supervision of the Civil Aeronautics Administration, but there are still other tests to be made. He is also the inventor of a plane he hopes to sell in kit form.



Freighter Swallows Midget

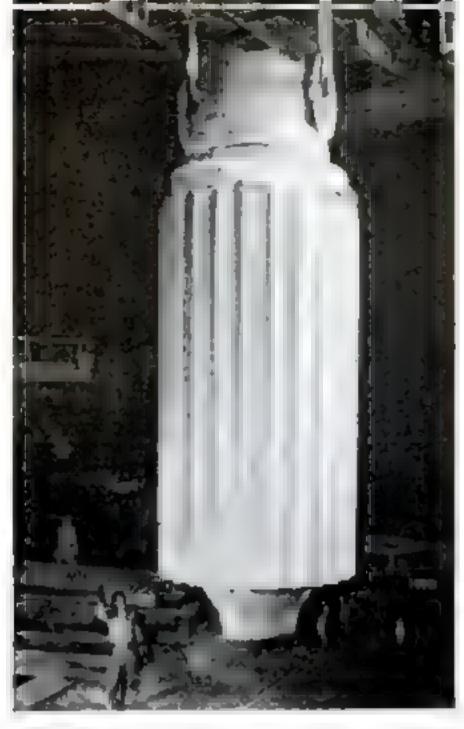
A BRISTOL FREIGHTER plane gulped down a midget plane recently through its huge front loading doors—and then proceeded to swallow a second one. The first was loaded headfirst, the second tailfirst.

The two smaller aircraft were destined for French Indochina. Bristols are used regularly as English Channel car ferries.

Radar Helps Pilot Shun Storms

THE days of those bouncy airliner flights in rough air will be over if a storm-detecting radar system being tried out by Panagra is adopted generally. It will "see" storms 150 miles away.

The company is testing the radar between Miami and Buenos Aires. It is installed in a DC-6B transport.



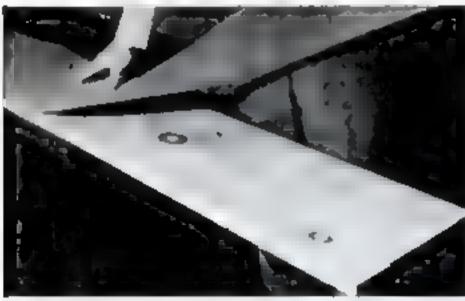
275 Tons of Steel—In One Hunk

This huge ingot, weighing as much as 160 Ford sedans, is on its way to a Bethlehem Steel forge to be pounded into a 110-foot column—one of 18 supports for a tremendous airplane press 10 stories high.



Man-Made Geyser Tests Nozzles

WATER, pumped from the Allegheny River, geysered 150 feet in the air (above) when engineers tested nozzles for fountains that will spout from a pool in Point State Park, Pittsburgh.



Paper Overlay Upgrades Lumber

SCHATISTS at the U.S. Forest Products Laboratory at Madison, Wish have discovered that a single sheet of paper treated with modern synthetic resus will hide knots pitch pockets, stains and narrow splits in a board above. They have also found, by installing paper-overlaid pine siding on a test building (right), that it holds paint well outdoors and slows wood-swelling.





Builing furiously with their helmets, damage-control crewmen improvise when pumps bulk.

How Sailors Learn to Save a Ship

Daily they rescue a bogus cruiser "bombed" in a bogus ocean.

"HE bomb that hit the USS Buttercup was delivered by a lone plane at 1700 hours, just before evening chow. Shattering plates and rupturing mains, the resulting explosion might have been fatal to the cruiser had it not been for the skilled work of her damage-control parties."

This could have been a news dispatch from an artificial ship in an artificial ocean at the Philadelphia Naval Base Damage Control School. Daily it weathers a tape-recorded air attack, is ostensi-

"HE bomb that hit the USS Buttercup was delivered by a lone plane at 1700 hours, just before evening chow. Shattering plates and rup-

The vessel, a two-deck section of a cruser, floats in a tank. Its survival depends on the quick thinking and trained action of men who work in water up to their necks, bail where pumps would normally not function, fight smoke and fire, plug and patch. How they do it is shown in the photographs on the next two pages.



1 LIKE THE DUTCH BOY at the dike, a spilor stops a leak with one hand in damage-control drill as his mates rush repair work.

2 shoring up damaged bulkheads is an negent task after the pumps, under mesh protectors at the men's feet, are back at work.



3 damage to the injured "ship," damagecontrol trainers use believes as buckets.



4 EVACUATING THE "WOUNDED" to safer areas must go on while part of the rescue crew struggles to plug gaps in the hull.



6 ORDERS FROM THE BRIDGE of the ever-sailing, ever-sinking cruiser are megaphoned to the men toding in water below decks.



REPORT FROM BELOW on the location of fire comes from a crewman in an oxygen mask, protected from smoke poisoning.

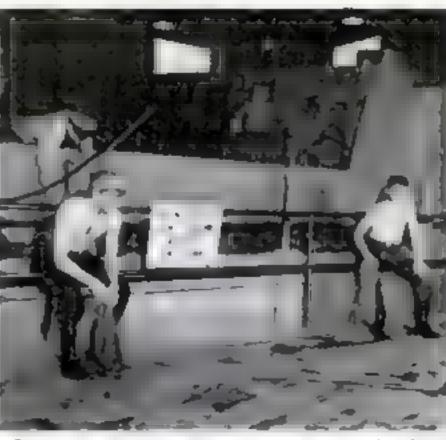


5 A NOTICEABLE LIST to the deck of the Buttercap develops as the damage-control party feeds pump hoses to flooded compart-

ments. The training vessel consists of a twodeck section of a U.S. cruiser. It is 18 feet long and its occur is a large indoor tank.



ALL IS CONSIDERED LOST if, despite the cescue party's grueling efforts, this pointer indicates a list of seven degrees.



9 EXHAUSTED RESCUERS grimly catch their breath and rest while the inexhaustible Buttercup regains an even keel. END

Gus Rides Out a Storm By Martin Bunn

Two scared kids in a jam take the Model Garageman out into one storm to quell another—between irate parents!

A DARKNESS came down, clouds piled up in the west and a sharp thunderstorm took the edge off the midsummer heat, Glad at the chance to catch up, Gus Wilson was working late at a top overhaul. The Model Garage lights were the only ones on in the dark business section of town.

The clatter of running footsteps outside the open shop door brought Gus from under the hood. Matt Bergstrom and Mrs. Adams, both winded, passed

the pumps and made for him.

"Gus!" Matt puffed, "Haven't you got a boat up at the lake? May be trouble there—kids got caught out in the storm should've been back hours ago. I thought they were at the Adamses and she thought—"

"Tell me on the way," Gus cut in. He bustled them into his car, strode over to pull the main switch of the garage,

and took out fast.

Panic Sets In

By the time they neared the lake, Gus had the story, Bergstrom's taffy-haired daughter Sally had gone for a swim and picnic with 16-year-old Guy Adams. They'd taken the Bergstrom outboard, heading for the beach on the far side of Thatcher's Island. When Sally didn't show up for supper, Matt assumed they'd waited out the thunder-storm at Lora Adams' home. When, at nine, Lora had called him, a kind of

panie had begun to lick at both parents.

"Neither youngster is a strong swunmer," said Lora. "I just hope that storm didn't eatch them out in—"

"Probably waited for the storm to blow over." Gits said quickly "and then discovered the rain had drow—soaked the ignition." It occurred to him that Matt and Lora had infected each other with a highly contagious anxiety, "We'll be there in a couple of minutes now, If the lake's not too rough, we might take a run out to the island. Probably find them soaked and sheepish. Will you dig

ment, Matt?"

The Party Sets Out

my flashlight out of the glove compart-

Fair-sized waves were tossing Gus's 12-footer at its pole mooring, and rain water sloshed the floorboards. "Doesn't look so bad," Gus told them briskly. "Lora, you get in the bow and hang onto the flashlight. Matt, will you do some bailing from the middle seat?" He stripped off the cover, checked the gas and spon the kicker.

The wind was behind them as they headed out onto the lake. A past-full moon showed occasionally through scudding clouds, dimly picking out the ridge

behind Thatcher's Island.

"Don't stand a prayer of finding anything in all this blackness," said Matt grimly. "I think we ought to go back to a telephone. Call the state police and



Gus uncoupled both ends of the gas line and drew out a two-meh bronze felter element.

get them to start a real search going."

The same idea had been in Gus's mind for minutes, "Maybe you're right." he conceded "But let's take a fast look at the beach first—we're almost there."

As they rounded the point of the is-

land, the hearts of all three in the boat gave a flip-flop—there was a campfire in the cove. The distant reddish light glinted off the aluminum hull of the beached Bergstrom boat, and two small figures danced like Indians in the firelight, Both Matt and Lora were calling as the boat slowed to coast in.

During the first moments of greeting. Gus busied himself with tilting the engine and pulling the hull up on the beach. Then he sauntered up to the group by the fire.

Storm Over the Lake

"... The silliest thing," Sally was saying, "Robinson Crusoe all over againmy name's Friday. I guess we were a little late in starting home. Anyhow, the clouds were awfully black, and we were

just coming out of the cove when it began to rain like anuthing and I made Guy go back because I just knew we'd get struck by lightning. He said we could take off the motor and turn the boat over for shelter-it was just drenching - but I knew that that met-

al hoat would attract lightning and-"

"So we just waited out the storm in the woods," Guy finished. "I tried to tell Sal that trees were no protection against lightning, but you know how it is with women."

Guy's good spirits evidently grated on Bergstrom. "That's all very well, young man. But the storm blew over hours ago. Why didn't you come home right afterward? Your mother and I were both ex-

tremely worried."

"Daddy, we tried to three times, but the motor kept sputtering out," Sally interjected, "The wind was against us and we didn't have any oars and that old motor kept stopping. So Guy built a fire in the *cleverest* way and we just waited until—"

"That's enough," Matt cut in. "I'll talk to you later, Evidently you've never heard of smart alecks who manage to run out of gas when it suits them. Well, young man, what's your story?"

"Look," said Lora Adams, "must we

stand around here while you put witnesses on the stand? These children are wearing wet clothes and I think it's important to get them home instead of letting you sound off."

"I'm not sounding off, But I don't propose to let my daughter go out with a kid who can't even tell a straight story."

"You mean he can't get a word in. If you'd stop bullying him long enough—"

"Bullying-that's a laugh! The important thing is why a young girl was kept out for hours when there isn't a shred

of justif-"

"Motor kept conking out, Guy?" Gus tossed a piece of wood into the fire. "Sounds like the rain got to it." He realized that flare-up, though it was just a reaction to anxiety, ought to be headed off if possible.

"Well, I thought

so too, Mr. Wilson, but it doesn't make any sense. Because each time it'd start right up and run fine at low speed with the prop in neutral. And then she'd quit as soon as we'd start out for home."

"That's very plausible, young manespecially the part about not making any sense. That motor runs like a clockhasn't missed a beat all season. What were you really doing-shutting off the gas line?" Matt's voice was fey,

"No. sir. I was not."

"Or did you just close the air valve on the cap so the gas wouldn't feed down?"

The Feud Begins

"I've had just about enough of this," said Mrs. Adams shrilly, "More than enough. I'm not going to stand around all night listening to somebody who's crazy as a hoot owl. Gus, will you take me home? You come with us, son-you've seen enough of the Bergstroms."

[Continued on page 224]



"We're making marvelous time just listen to this old buggy purr!"



How to Hitch an Engine to Your Bike

A two-cycle power plant that you can attach with hand tools will whiz you along at 25 m.p.h. and run for only a few cents a day.

By Howard G. McEntee

EVEN the peppiest pedal pusher sometimes wishes he could keep rolling just by twisting a throttle. But the gap between an ordinary bike and a powered one ordinarily can't be plugged for much less than a hundred bucks—except with this homebuilt rig.

That doesn't mean jerry-built. This power unit is mechanically clean, functional, good-

looking. You don't have to be a machinist to make it; the whole job can be done with hand tools.

What does it cost? The engine is the most expensive item. Mone is a 1.5 hp. Power Products AH-36, costing \$47.50 brand-new. You can save by getting a factory rebuilt, with a new-engine guarantee, for about \$36. With its horizontal cylinder, this engine is ideal for rear-wheel mounting.

If you are willing to settle for 1 hp., the



RIDING TRIM. Neat as a cotter pin, the rearmounted engine drives the wheel through a friction roller, leaving pedal drive and coaster brake intact. No machining is necessary: all the work can be done with hand tools.

model 1000 is available for about \$25. It was widely used on power mowers, and you may find a secondhand one for even less. The other materials add up to about \$13.

Roller drives the wheel. Only a friction drum or roller is mounted on the engine shaft; there are no pulleys or sprockets. Two coil springs pull the roller down against the top of the tire. This drive puts no torque strain on the spokes, and leaves the chain drive and coaster brake ready for normal use at any time.

The roller is disengaged from the tire by lifting the engine a fraction of an inch. This is done by a forked lever terminating in a handle below and in front of the seat. The clutch can be held out by a cutch to let the engine idle at traffic stops.

Although the engine is on the left side, off center, no imbalance is noticed when riding. It may, however, tend to tip the bike if it is held up by a kick stand. A rear stand is more secure.

Put wheel in shape. The rear wheel bearings and coaster brake must be in good

order. Check the wheel for wobble. If the rim is warped, it may have to be replaced. Otherwise, a wobble can usually be repaired by adjusting spokes, a job for an expert.

Mounting the engine. My engine came with a blower, an aluminum base and a small muffler. I removed all these, plus the governor mechanism with its cover. Thus stripped, the engine weighs about 13 lb.

The engine mount and clutch parts are made of common strap- and angle iron, pipe and h" bolts. This is all simple hacksawing, filing and drilling. The rear fender has to be cut in two places. The rear bracket is clamped under the axle nuts, and the back fender section bolted to it. Two braces from the bracket are attached with clips to the rear fork.

The engine mount, consisting of two pieces of angle, pivots on the bracket and is connected to the clutch lever by slotted joints. Make certain the clutch lever is long enough so that its U-shaped voke comes in front of the seat when it is up.

The clutch mount may have to go above or below the fork behind the sent post, Try it both ways before drilling for the clamp bolts, and space these to miss the frame members. On my bike, the mount fitted best with the angle up, so the tapped holes go through the apex of the angle stock.

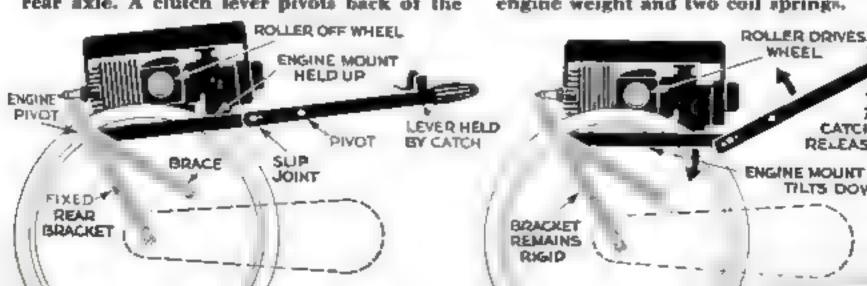
All bolts at the pivot joints must be positively locked, and drawn up to leave a minimum of play without binding. One member of each joint is therefore tapped. Drill No. 7 holes and thread them with a 4"-20 tap.

A 3/16" dural plate, 3%" by 6", is bolted to the left engine mount in two places and drilled to match the threaded mounting holes by which the engine was bolted to its base. You can clamp the plate to the dis-

How the Drive Works

All parts of the bicycle but the rear wheel and chain have been omitted in these duagrams for clarity. The engine mount pivots at the rear on a bracket rigidly bolted to the rear axle. A clutch lever privots back of the

ent post. It is connected to the engine mount by a slotted slip joint. When the clutch lever is held down, the roller is raised off the bike wheel. As the clutch lever is allowed to come up, the engine tilts down, and the roller is held in draving contact with the wheel by engine weight and two coil aprings.



CATCH

RELEASED

TILTS DOWN



LIST OF MATERIALS

Engine: Power Products Model AH-36, type 1007 (Power Products Corp., Grafton, Wis.)

Roller: flat-belt pulley, compressed-paper face, metal hub, %" hole, 1%" to 2" dta., 2%" long (Frank Tracy, Ioc., 202 Centre St., N.C.)

Controls: auto choke cable (throttle), breycle brake lever and cable (compression release).

Exhaust: Briggs & Stratton muffler No. 89966, %"-pipe floor flange, %"-by-4%" pipe nipple, %" 90° elbow

Compression release: plug-cock valve (%" pipe thread), %"-by-%"-by 2";" dural or brass plate

Frame stock: 5' of %"-by-%" angle from, 3%' of %"-by-1" flat iron, 2%' of %"-by-1" strap angle from, 12" 1 16"-by-%" strap iron, 12" of %" pipe.

iron, 12" of %" pipe.

Engine plates: 3 to" dural or steel, 3%"-by-6" and 4"-by-5".

Mocellaneous: Two tension springs, %" dia., 4" long; throttle and compression-release springs, elbow catch, rubber clutch grip, sheet metal for guard, %" bolts, nuts, lock washers.

COMPRESSION RELEASE makes starting easier. Lat two short fins off cylinder head as shown below. Space between plug and cylinder wall is too small to screw valve in directly, so it is mounted on a dural plate, and a hole is drilled in the head directly under it. Four holes are tapped 6-32 for mounting bolts. Cut gasket of exhaust-gasket stock. Take valve apart, clean off grease, inbricate with graphite. Mount spring as in lower photo.





WEIGHING ONLY 13 LB. with governor and blower removed, the engine rests on three spacers on a plate boited to left engine mount. The roller (center photo) is a flat pulley, here shown with a radiator-hose sleeve cemented and screwed on it to increase

carded base and drill through it to spot the holes.

Making the roller. I first used a 1%"-diameter flat-belt pulley made of impregnated, compressed paper, with a rubber-hose sleeve over it. The hose was cemented on with Phobond and further secured with three 6-32 screws, with star washers under them, at each end,

Later I switched to a 2" pulley of the same kind, without the rubber sleeve. This works well and has nothing to come loose. A similar east-iron pulley could be grooved longitudinally to increase its driving friction.

The roller diameter determines your drive ratio (wheel size has nothing to do with it). If you live in hilly country, or want maximum pickup, you might try a 1%" roller. A 2" roller, however, makes the engine easier to start, and gives higher top speed and better gas mileage.

Aligning the roller. Check the required height of the engine shaft (roller diameter considered) above the tire. Then saw three spacers from "pipe and file the ends square to the required length. Mount the engine with "bolts and lock washers. Be sure the bolts enter the threaded holes far enough to hold securely, but not so far that they hit bottom.

With the engine in place, the roller can be mounted on the shaft. The pulley I used has a metal hub, with a keyway and a set screw. But my engine had no keyway, so I drilled and tapped the hub for a second sctscrew 90° from the first, centered the roller over the tire, and spotted dimples in the shaft through the setscrew holes.

A vertical 3/16" plate is bolted to the

50 POPULAR SCIENCE



its diameter. A pulley of suitable size will drive without the sleeve. Note pipe flange fitted to exhaust port (above) and throttle return spring (over shaft). A 3/16"-by-4"-by-5"4" plate (right, above) is bolted to the right-hand engine mount. Long bolts and

right-hand engine mount. Long K"-20 bolts, with spacers on them, enter two of three tapped holes in the crankcase by which the governor cover was formerly attached.

The controls. An auto choke cable on the right handle bar controls the throttle. No cable is needed for the choke; the rider can easily reach behind to open it after the engine warms up. However, I did add a compression release to make starting easier. This is a small plug cock (made for a compressed-air system) mounted on the cylinder head, with a control cable to it

Try starting up without a compression release; you may not need one, If you do, take off the cylinder and cut off two of the short cylinder fins on one side of the spark plug with a coping saw, afterward filing the surface flat. As there is not room between the plug and the cylinder wall to screw in the valve itself. I mounted it on a small plate as shown on the facing page.

Guard and muffler. A roller guard, bent from light sheet metal, is bolted to the fender in front and the engine bracket in back as shown on page 148. Although mine ducks under the exhaust pipe, it could be run over it and even widened to enclose the pipe and muffler. The flywheel is a smooth bell without spokes or projections, and seemed to require no guard.

The original muffler would not clear the tire, so a %"-pipe floor flange was cut down to fit the exhaust port, and a pipe nipple and elbow screwed on. As the original muffler had little quieting effect, I installed a bigger, more efficient one.

When starting out, drop the roller on the tire before starting to pedal. Open the com-

spacers tie it to the engine crankcase. A strong spring on each side, hooked into a hole in engine mount and on the bolt holding the brace to the fork, pulls roller against tire. Adjust tension by moving brace, Bike wheel must rotate engine past compression.

pression release, start pumping, and when the flywheel is turning, close the release and open the throttle. To start up with the engine already running, disengage the chitch and pedal off; then let the clutch engage. Engaging it from a standing start will wear the roller unnecessarily.



reported is controlled by an auto choke cable run up the right handle bar. A small collar held by a setscrew adjusts iding position. The lever under the hand grap is for a front-wheel caliper brake, desirable with motor power to release coaster brake of some of its load. The compression-release control, a similar lever, is on left handle bar.

CLUTCH IS HELD in disengaged position by an ordinary supboard elbow catch, fastened to the upper frame bar with two self-tapping screws or with 6-32 bolts in tapped holes.

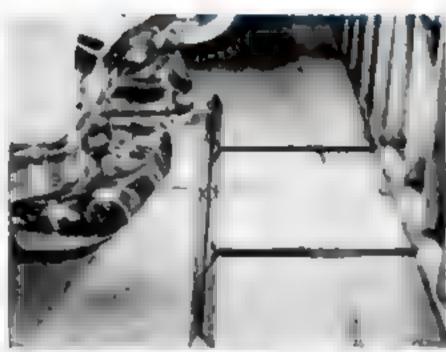


AUGUST 1954 151



New for Your Car

1. Car Cover is Awning, Too. Pull this cover out of a roller attached to your car's rear bumper to protect it from the elements. Release it, and it rolls itself up. A broad awning and supporting arms fitted with suction cups that grip the side of the car can be added to provide a shady spot or dressing tent at the beach.



2. Wheel Stop Protects Garage Wall. Drive that long new car all the way into the garage and stop a fraction of an inch from the wall with the help of this adjustable wheel stop. Extend it so the wheels hit the stop bar just before the bumper touches the wall, to provide maximum clearance at the back end for closing the garage doors.



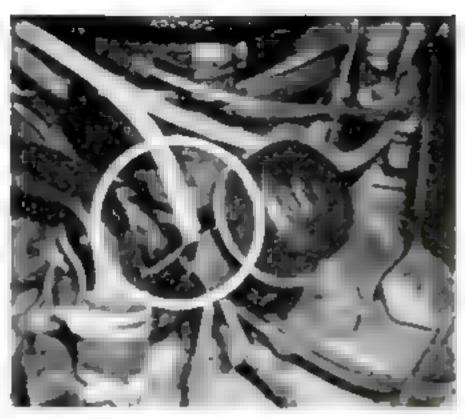
3. Car Necessities Are Combined in Kit. This neat vinyl plastic case holds an assortment of handy objects for your ear. It contains a whisk broom, windshield scraper and cleaning cloth, bottle opener, comb, pencil, screwdriver, sewing kit and a small flashlight. When closed, the kit fits compactly in the glove compartment.

4. Feather Identifies Car. You'll locate your car instantly among hundreds of others in a crowded parking lot if it flies this brightly-colored pheasant feather on its antenna. The feather also indicates the wind direction when the car is standing still.





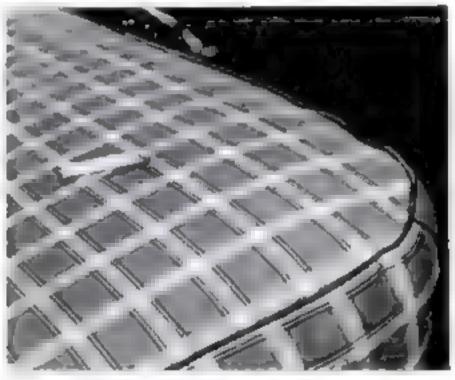
5. Lever Lifts Wheel on Drum Lugs. Put your spare wheel on without effort next time you get a flat. This wheel lifter centers it and slides it up on the lugs in one motion. It can be used on drums having holes for bolts, or on the type with studs.



6. Attachment Draws Vapors from Crankease. Installed on the crankease breather pipe or overhead-valve cover, this unit draws sludge-forming vapors out of the crankease and delivers them to the intake manifold to be burned away with the fuel mixture. The manufacturer claims that it extends the useful life of the oil and filter, and adds light lubrication to the tops of the cylinders and valve stems.



7. Spray Dries Wet Ignition. Differing from insulating spray that keeps water out of a car's ignation system, this chemical is sprayed over the electrical equipment to drive the wetness out. It is claimed that a water-soaked circuit can be put in service a few minutes after spraying, and that the application will protect the system for several months after. The solution can also be used to coat tools against rust,



8. Seat Covers Resist Burns. Sparks from a cigarette, or even a lighted match accidentally dropped on the seat, won't burn holes in these seat covers. The fabric is impregnated with a special resm, which the manufacturer claims releases a flame-smothering gas when heated. The covers are woven of the same material used to make tire casings and are said to be static-free and impossible to tear.

Your Shop Can Save

Sprucing up the old homestead yourself can put dollars in your pocket—and be fun, too!

DO YOU think of a workshop as just a place to play? Ideally, it's most relaxing that way. But there are times when a shop

justifies its existence in a more material way. Storm windows, screens and other home improvements that come out of a shop can make it a source of pride—and dollar savings—for the entire family instead of just a place where Dad secludes himself to putter around.

Most impressive-and often easiest to



NONEY SAVER 61 Put a Radiator



54 POPULAR SCIENCE

You Money

make—are things that dress up a home. Below is the first of four projects that can be made in any workshop—from the most claborate, down to the small bench and rack of hand tools—and they'll give a reputation to both you and your shop. Remember, too, the dollars you save can go toward new equipment to help you save even more.



Under Cover for \$3

Wire lath, shelving and strips of molding go together to make this attractive radiator cover.

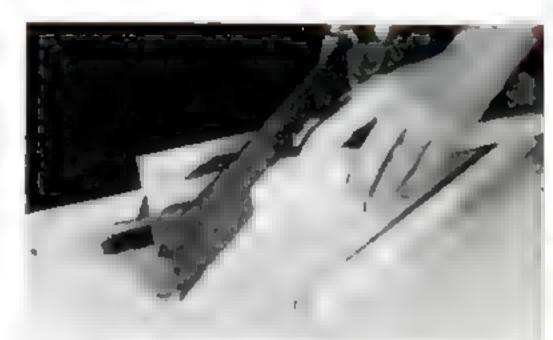
MADE without claborate carpentry or framing, this radiator cover provides a rainy-day play surface for tots and keeps them away from the hot metal

Nail quarter-round molding to the floor around the radiator and bend a piece of wire lath—the expanded type used by plasterers—to fit snugly inside it. Cut two strips of one-by-two and nail them inside the vertical rear edges of the lath to stiffen them. Bend the sharp ends over the one-by-two strips to get them safely back against the wall.

Place the lath in position around the radiator and cut the top from shelving or %" plywood to fit over the top edges. Nail 1" half-round molding to three sides of the top, leaving the extra %" projecting below the bottom surface to retain the lath.

When you're satisfied that all is square and level, fasten the top to the wall or window apron, using one of several methods shown on the following page, so that the cover can be removed for cleaning inside.

Paint the base molding and shelf to match the woodwork in the room. The wire lath comes finished black and need not be painted, but if you decide to finish it, too, you'll find a paint spray bomb much easier for the job than a brush.—Elizabeth H. Wagner, White Plams. N Y



USE MITER BOX to cut neat, tight-litting 15 corners to quarter-round molding.

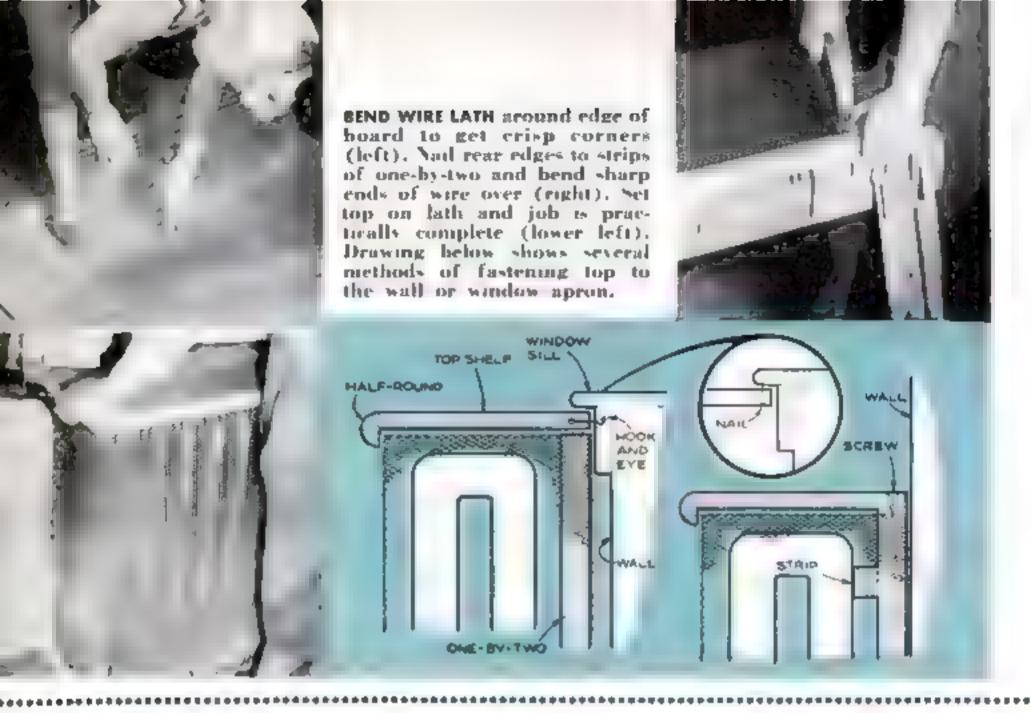


SHAPE WALL ENDS of sidepieces to be snugly against basehoard. Coping saw does the job.

NAIL MOLDING TO FLOOR around radiator to keep lath from sliding out at the bottom.









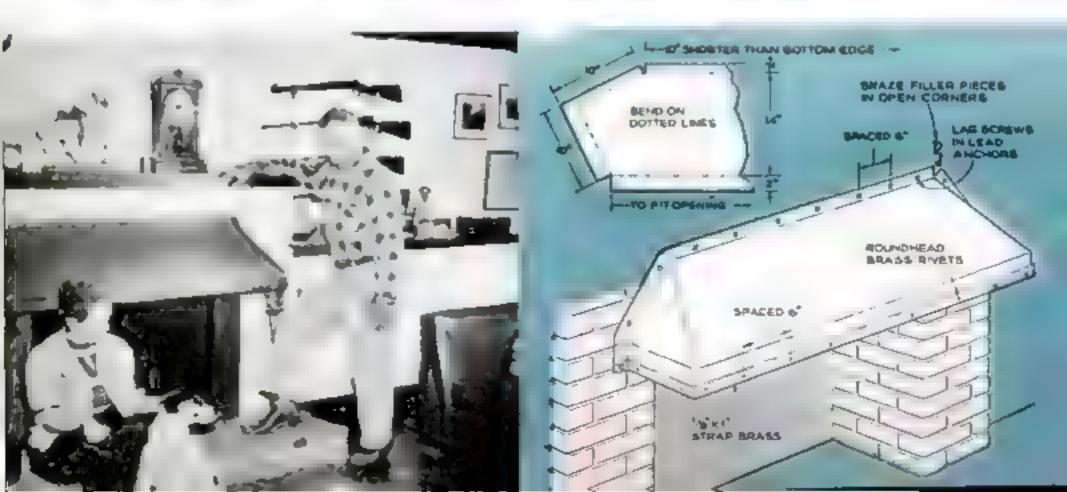
Make a Copper Hood to Dress Up Your Fireplace

This hood can work wonders for your draft-dodging fireplace. It's mighty good-looking, too.

A GLEAMING copper hood will certainly improve the appearance of a large fireplace, but more important, it will increase the draft, making the fire burn cleaner.

Make it from a sheet of copper at least 1, 32" thick, cut and bent to fit over the opening. Bend up a flange on the three edges that fit against the brick and braze a piece of copper over the gap in each top corner of the flange. Bind the overhanging edge with %" strap brass.

Hang the hood over the fireplace opening with lag screws set in lead anchors. -Hi Sibley, Nuevo, Calif.





Save those old pictures! You can serve drinks off them, make a wastepaper basket or a lamp.

THOSE pictures just hanging on the wall can be put to practical use and still decorate a room. These ideas show how you can make framed pictures into charming room accessories. One idea gives a picture a double purpose: an occasional table for tea or cocktails, which can be folded and hung out of the way on the wall . . . as a picture.

Choose a picture in a heavy frame for conversion to a table. Make legs by gluing %" dowels in holes drilled at a slight angle in beveled wood blocks. Attach the blocks to the back of the frame with hinges so that the legs will fold flat against it. The legs should be about 15" long, shorter if they extend beyond the edges of the frame when folded.

Use four frames of the same size and shape for the wall lamp. Assemble them into a square by gluing or nailing the inside edges to cleats. Remove the picture from the frame that rests against the wall and

LEGS, glued into beveled blocks, fold flat on hinges so table can be hung on the wall.

replace it with a piece of X" plywood. Screw the light fixture to the plywood and attach the hanging ring to the top edge of the rear frame. Screw a ring at each lower corner of the front frame to trim it off.

Join three identical frames on three 18" lengths of %" dowel to make the off-the-floor wastebasket. Attach the dowels to the edges of the frames with glue and nails. Fit a triangular piece of plywood inside the frames at the bottom to complete the basket. Lacquer the dowels to match frames and finish off the tops by driving rubber-headed tacks in the dowel ends.



Frame Your Pictures with Siding

The tongued edge makes perfect picture-frame molding. All that you have to do is cut it to size.



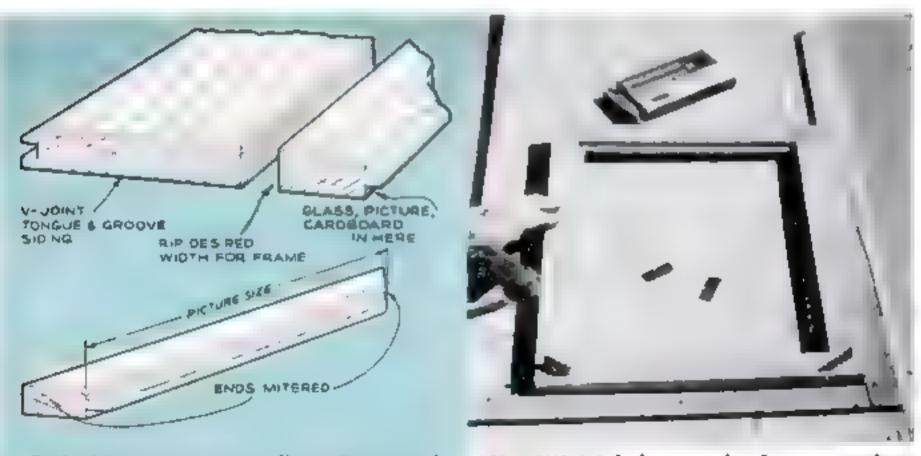
CHORT ends of V-joint tongue-and-groove Doords cost you next to nothing. The underside of the tongue is already rabbeted deep enough for a picture, glass and backing board. The top beveled surface and rounded edge of the tongue resemble a

decorative molding.

Rip the boards to the desired width and cut the ends in a miter box, measuring along the inside edge of the rabbet when cutting to length to fit picture. Make an assembly jig by nailing two strips of plywood to a flat board. Use a framing square to be sure the two strips are nailed at 90° to each other. Lay the frame pieces in the ng face down, pressing the top and one side against the plywood strips. If the parts are cut accurately, the bottom and opposite side should fit squarely against them. Drive nails into the board to hold the frame together while you drive a corrugated fastener across each joint.

Sand the face and edges smooth and finish as desired. Insert the picture, with or without glass, as you prefer, and cardboard backing. Glue wrapping paper over the back to give the job a professional touch.-

Leslie P Young, Sarasota, Fla.



THIS IS V-JOINT SIDING. Rep off tongued edge to width needed for picture frame and use it just as it is. When cutting to fit picture, measure along inside of rubbet, not edge of tongue. Miter pieces accurately, or frame will not be square.

ASSEMBLY JIG helps put the frame together. Plywood strips hold top and one side square while the bottom and opposite side are fitted to them. When entire frame is square, drive nails into the board to hold the two loose parts in place while corners are fustened with corrugated metal fasteners.



New for the Handy Man

1. Electric Drill Starts Mower Engine. Instead of yanking a starting rope, mower owners can now start their engines with an attachment that fits in the chuck of an electric drill. The device engages a cone pulley, which is attached to the crankshaft, spinning the mower engine until it starts.



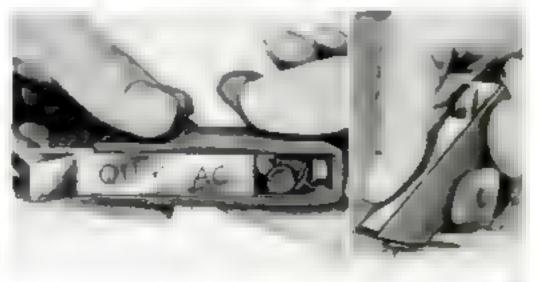
2. Lawn-Sprinkler System is Permanent. Packed as a kit, to be fitted and installed in lawns of any size and shape, this sprinkler ends dragging out a hose for watering the grass. Eight sprinkler ground, cover a large area. ever you need it.

3. Utility Hook Has Many Uses. Shown here supporting a garbage can out of reach of dogs, this handy hook can also serve as a hanger for garden tools, fire pails, coils of wire, clothesline and laundry bags. Three screws an-

this clear-plastic tube with weed-killing solution eliminate dandelions, thistle and other pests from your lawn. Press the lower end of the tube over the weed center. A sponge tip saturates heads, set flush in the chor the book securely wher- the weed without harming nearby plants.

5. Tack Puller Drives 'Em, Too. One end of this tacking tool has a magnetic surface that gnps the head of a tack for easy driving (far right). The other end has a slide-out claw that pulls tacks and deposits them inside the holder for re-use.

1 Funt Engineering Co. P.O. Box 605. Flint Mich., 2 Plustip pe, Inc. 5:44 W. 164 St., Los Angeles 3 Engman Mig. Co. 1317 Locust St. Der Motnes, lawa, 6. Gro-Quick Sales, 10112 Lanack Ave., Detroit 4, 5 Osrone Products Co., Inc., 95-10 218 St., Queens Filtege 29, N Y







ROOFING went on fast, first the five pieces at rear and then those at front, using galvanized nails.

THERE'S no need to let that handsome new hunk of sheet metal stand out in the broiling sun—or in the frozen sleet to come—if you allot about \$35 and one good day's work to remedying the situation. It's an easy, rather pleasant job, and even if you dawdle disgracefully, it'll be done in a weekend.

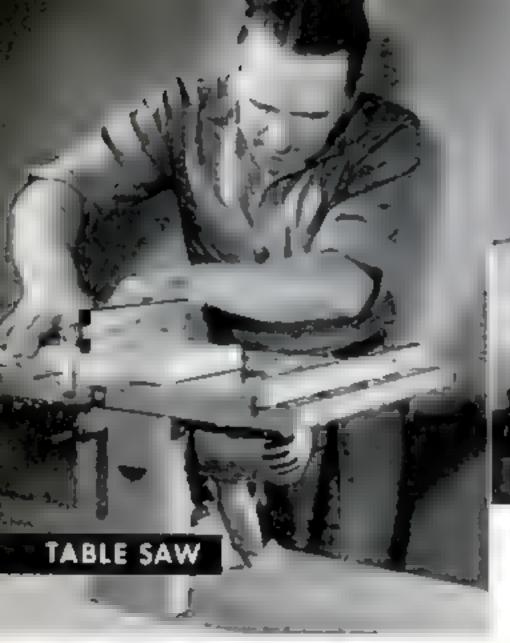
I cut the plates, studs and rafters to shape, laid out each side flat on the drive-way, and nailed it together with 16-penny common nails. After making another side frame, I raised the two (borrowing a neighbor's hands helps here), nailed the rear cross plate in place, and put on temporary braces.

After the frame was plumbed with a level, I added the two-by-six headers and

the corner braces. Bigger braces might be desirable if the site is exposed to high winds, but may involve you in a head-conking hazard. Next came the rafters, which were placed on 36" centers, with the exception of the fourth rafter from the front. This one was spotted where it was most useful in backing up the overlap of the sheet-metal roof.

I used V-crimp galvanized roofing, and needed five sheets of 24" by 10', and five of 24" by 8'. This gave me a 9" extension beyond the framing at each end and a 3" overlap at the center. The floor plates were secured to the concrete by lag bolts run into star-drilled holes. A fast coat of paint on the exposed wood finished the job.—John Rogers, Decatur, Ga.





GENEROUS WORKING SURFACE is provided by extensions on each side of saw table. Blade adjusts for depth of cut but does not till. Rip fence and moter gauge are included; guard and splitter are extra.

Husky Drill Drives Quick-Change Tools

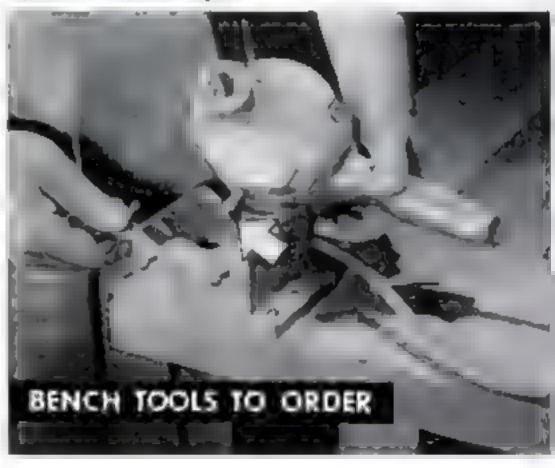
COMPLETE SHOP ON ONE BENCH. Power unit is being attached to portable saw (below) while other tools stand by ready for action. Granding attachment (on bench at right below) has housed wheel and adjustable tool rest.





changing is quick and easy. Spindle housing (arrow) on power unit is machined to fit split hose in tool casting. Tightening one screw locks unit securely in place. Blade is mounted directly on spindle.

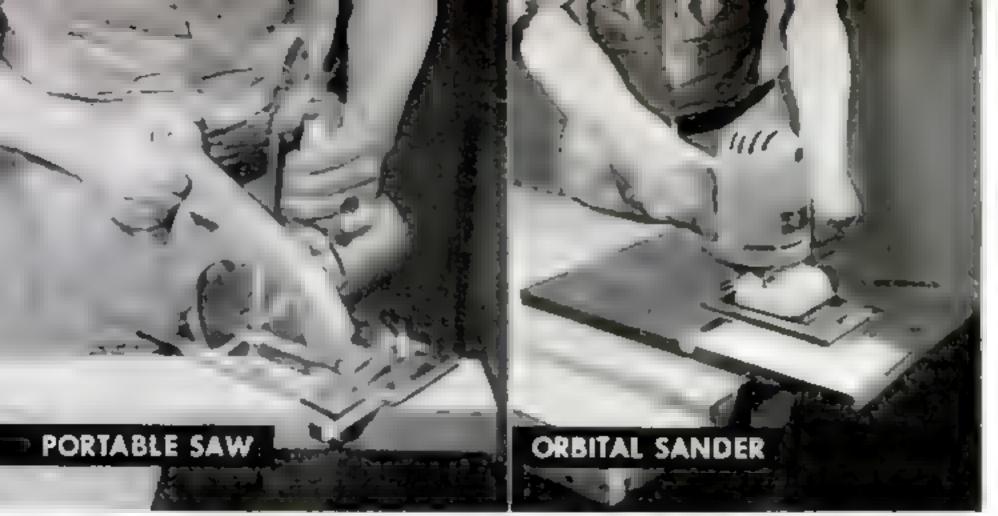
MOUNT TOOLS ON WORKBENCH in seconds with quick-locking bench stand. Tapered stud (arrow) screws into side of unit and draws it tight against stand as T-handled screw is tightened against taper.



This versatile outfit bridges

BY PURCHASING all these rugged workshop attachments in one package, you can quickly fit out a home shop at reason able cost. Or, they may be bought as needed, starting with the basic power unit, which includes a %" capacity Jacobs drill chuck, polishing bonnet, sanding disks and back-up pad, spindle arbor for buthing or grinding wheels, and an extra handle for use on either side of the drill

162 POPULAR SCIENCE

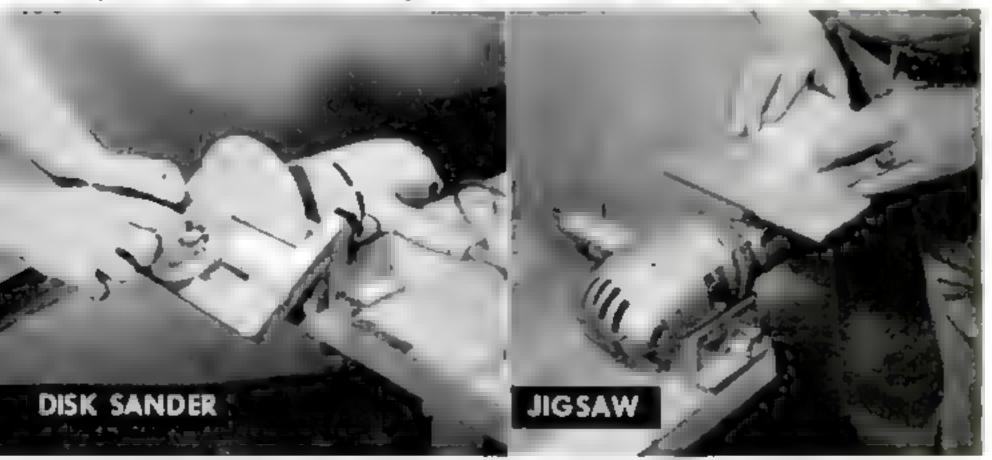


DRIVEN AT 3,200 R P.M. htt power unit, well-halanced portable saw cuts to 1% depth deep enough to handle joists, rafters and all other lumber used in home construction. It uses same 6" blade as table saw.

ONE-THIRD OF STANDARD SHEET OF SANDPAPER is held on rubber-backed sanding shoe by two spring clips. Mechanism is counterhal-anced, reducing vibration to minimum. Sander produces smooth finish on wood or metal.

THE TABLE and adjustable angle gange permit sunding compound angles. Sandpaper is applied to 6 disk with adhesive, Table is attached to beach stand by two screws shown in photo at left. Disk screws on spindle.

SHOWN HERE WITH TABLE for bench use, jigsaw can also be used without table as portable jig-aw for cutting into large panels of wood or sheet outal. When hand-held, it starts its own cut, clammating drilling of starting hole.



the gap between light attachments and heavy combination tools.

The heart and muscle of the attachments is a heavy-duty %-horsepower unit rated at 4.0 amps. It is not just an electric drill that can be used with attachments, but rather, a compact power plant, made to drive the attachments, and supplying more than enough power for the many operations that can be performed with them. Its speed, 3,200 r.p.m., is faster than most electric drills, making sawing and sanding easier

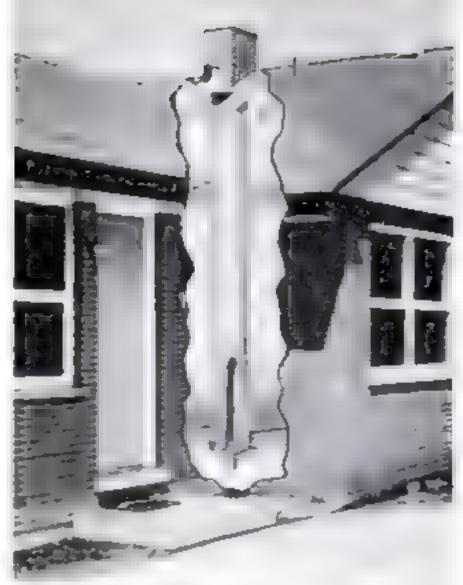
and faster. You can buy an extra power unit without chuck or accessories for economical permanent installation in one of the most-used attachments, such as the portable saw or table saw. Tightening one screw locks the unit to any attachment or to the bench stand without fussing. Called the 888 power unit, it will be in hardware stores in September. Millers Falls Company, Greenfield, Mass., makes it.

Kit Makes It Easy to Build a Chimney

No need to be a mason. Just put together the prefab sections.

You might think building a chimney is a job for an expert mason. Well, here is a kit chimney that can be put up in three hours. Four textured panels mounted around the roof flue give the appearance of brick. The panels are 3/16" cement-asbestos that can be painted to match any color. They are available in various heights. To top it off, a rain cap that comes with the kit keeps rain from entering the flue. Installation of the flue sections is about as easy as stacking blocks. Thermal-setting cement takes care of the hard work.

The Van-Packer Corp., 209 South LaSalle St., Chicago, makes the kit.



CHIMNEY is suitable for use with heating plant or incinerator. Manufacturer does not recommend use with a fireplace—the opening is too large to be readily adapted.

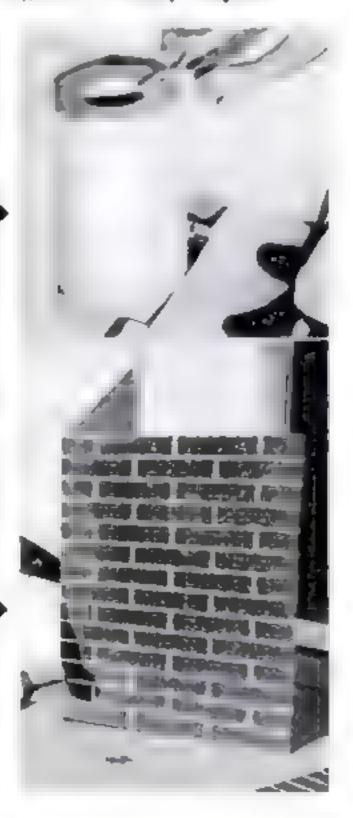


CHIMNEY SUPPORT is seated in floor opening cut between joists. All sides of the support are noiled to framed opening between the joists.

rive Joints are cemented and secured with an aluminum drawband. Clearance from flue to wood is unnecessary because of insulating capacity of trusonry sections.

is installed on roof around the base of the flue to keep moisture from seeping in. The roof and cesting openings were projected with a plumb line from the floor to permit passage of the flue sections.

"RRICK" PANEL housing, 16" by 24", for the chimney is assembled on the ground. Before putting it over the flue, the proper pitch of the roof is determined by placing a panel flat on the finished flue. Panels come in lengths up to 5'.

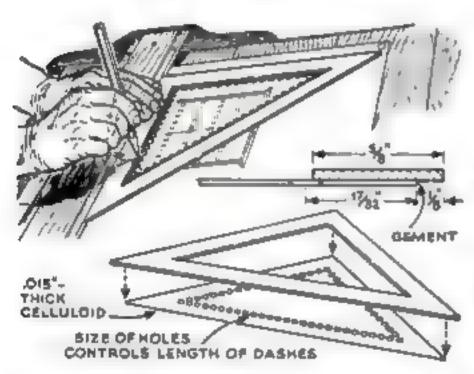


A POPULAR SCIENCE



Calk Compound Cleans Clocks

Calking compound of the cord type, which has a prolonged tackiness, is handy for extracting dirt from clocks, cameras and other mechanisms. Shape a piece so it will reach the material to be removed. After the compound has picked up a quantity of dirt, knead it to expose a fresh surface.—Walter E. Burton, Akron, Ohio.



Drawing Dashes is Easier

With this reworked celluloid drafting triangle, drawing dashes becomes almost as simple as drawing a solid line.

Any triangle can be used. Enlarge the center to leave a strip about %" wide. To get the inner edge parallel, use a saw and then file accurately to the line.

Celluloid, sold in auto stores for convertible windows, is suitable for the inner part. Cut it %" smaller than the triangle. The recess thus formed will keep ink from seeping under the outer triangle edge.

Lay out the holes with their centers 1/32" inside the triangle edge. A counter-sink gives a satisfactory bevel. Make the holes a bit larger than the dash length desired. Attach the parts with film cement.— E. P. Meyer, Albuquerque, N. M.

Flagpole Walks Out of Hole

AFTER dirt had been dug away from the concrete footing of a flagpole that was to be removed, it was found that a derrick would be needed to lift the heavy weight out of the hole. Two smart men worked together to walk the footing out by tilting it and shoveling earth under the raised side. Then they leaned it in the opposite direction and tamped soil under the opposite side. This was continued until the concrete block was at surface level, where it was rolled to a truck and loaded on.



How I Make Scratch Pads

If you are an amateur photographer, what do you do with the unsatisfactory prints you discard in the darkroom? I cut mine into uniform sizes and use the backs as handy scratch pads on the telephone desk.—Clinton R. Hull, Costa Mesa, Calif.



He Shoots Pin-Ups

This ace photographer of boats and boating has gone down to the sea with his camera for better than 50 years. Here he tells how to shoot sea, ships and sky.

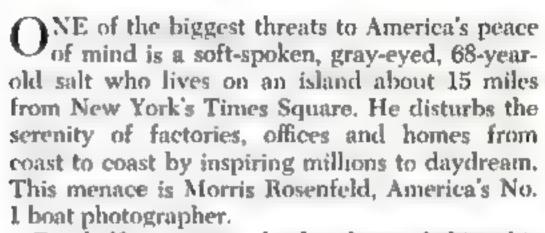




By Dave Stanley



Photo trick here is to anticipate not only the second of the leap but the split second when the boat will be at the peak of its lift.



For half a century, he has been clicking his shutter at stately windjammers, sleek ocean-going sloops, Snipes, bugeyes and prams. In magazines, government films, travelogues, ads—even as huge murals in famous sea-food restaurants—these eye-filling photographs of boats heeling gracefully before the wind have stirred the national wanderlust.

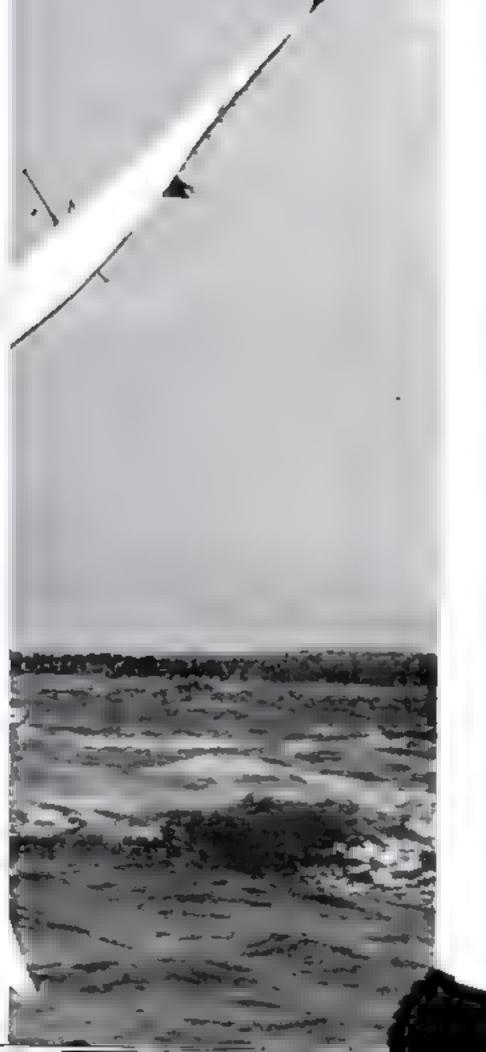
Although Rosenfeld runs a thriving photographic studio, his mainstay and first love is taking pictures of boats. And his marine-camera wizardry has paid off handsomely. Prints of his famous nautical pictures hang in yacht clubs and homes of boatowners from Maine to the Persian Gulf.

Steady Hands and Stout Sea Legs

If you're Morris Rosenfeld, you generally shoot from your own motorboat, the Foto, a 23-knot studio-darkroom. You shoot from a deck that bucks like an unbroken mustang, holding your camera steady with both hands and balancing yourself only with your sea legs. You will chase a

RACING SLOOPS tack on the windward legtou have to know racing tactics, as Morris Rosenfeld does, to be in the right place at the right time to get deamatic shots like this.

AUGUST 1





STARTLING SPRAY PATTERN made by this sport fisherman is a Rosenfeld trick, not often used. Boat is following in wake of the Foto. Nature furnished the nice clouds, he adds.

OOING GETS ROUGH sometimes—and tough for the photographer who is using both hands to hold his camera. Rosy's camera case almost slid into the sea while he took this.

craft for hours, while keeping out of the way of other boats in a championship race, to frame your target in the best relationship to sea and sky.

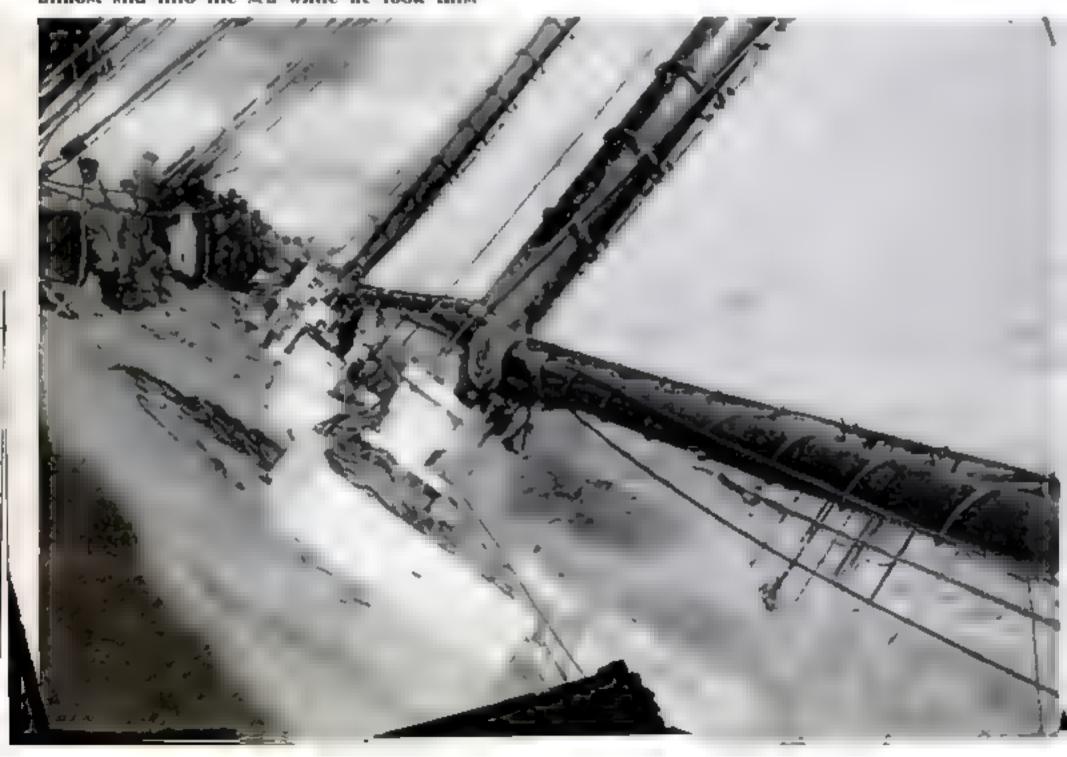
Sitting in his spacious New York studio, Rosenfeld told me that the key to marine photography is "knowing what to say." knowing what to say, however, presumes a keen knowledge of boating, as well as cameras, film and filters

Sea Savoy Wins Him Rare Shots

His nautical savvy, for example, tips him off when a new tack is to be taken. Alertuess to what strong winds can do has brought him rare shots of masts snapping off or boats heeling completely over.

Rosenfeld is also a first-rate mechanic. Not long ago the Foto was stalled off Long Island. Heavy winds threatened to hurl it against jagged reefs. Rosenfeld quickly traced the trouble to the carburetor, took it apart, repaired it and reassembled it. Before long the Foto was chugging safely away from the reef.

The sky and the water always fascinated Rosenfeld, who bought his first camera, a 4 by 5 Graphic, back in 1896. Actually, the poor East Side kid didn't buy it himself; he went "halfies" with some grade-school chums. When his day for the camera came,



Speedster

E COLOR

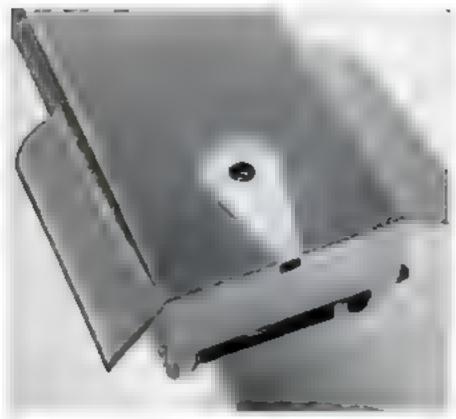
cement a couple of ounces of ballast to the front of the bulkhead. A ping pong ball forms the pilot's head, and the windshield is a scrap of acetate sheeting edged with tin. To finish off the hall, sand down the assembly and cover it with model tissue then paint with hot tile proof dope

Pump and housing. Before building an engine mount, the driving unit should be





OFF TO A FLYING START, the hydrojet speedster is already climbing. Top and side elevations on opposite page are half size for a boat powered by an .047 displacement engine. The upper detail drawing at left indicates the planing angle; the exploded section below it, the pump-housing pattern and impeller-and-shaft assembly.



OPENING AT BOTTOM OF PUMP HOUSING takes in water which is kicked back through rectangular port at the stern. The planing angle of the hull eliminates need for a water scoop.

assembled and placed in the hull. The pump housing is made from a single piece of tin-can stock (see detail drawing). Dotted lines are right-angle bends, and the tab extension between the pear-shaped bottom and top sections is curved around the rotor end to form a continuation of the sides. Butting edges are soldered, starting at the nozzle to insure good alignment. Make sure that the bearing hole is centered with the larger water-intake hole. A short piece of tubing should be soldered over the bearing hole to keep the impeller shaft aligned. This impeller shaft has a slot sawed in one end to receive the blade, which is a strip of thin brass stock curved in the form of a shallow S.

Before mounting the blade in the housing, solder a short arm, or "dog," to the top of the impeller shaft. Then tin both the slotted end of the shaft and the blade, scraping off just enough solder to let the notch slip firmly over the center of the blade. To mount, turn the housing upside down and press the shaft through the bearing from below. Drop a small washer through the water-intake hole and over the notched shaft end. Slip the blade through the nozzle with tweezers and press it onto the shaft. Rotate the shaft to make sure the blade doesn't scrape against the housing, then solder it in position.

Engine. The power plant is a miniature gas engine, suspended in a U frame of %" sheet balsa directly above the impelier shaft. For the slightly angled coupling between the engine and shaft, a pin on a flywheel engages the shaft dog. The flywheel is a large iron washer backed up by a small V-groove pulley turned from hardwood. Mount the fuel tank on one side of the cockpit floor and connect it to the engine with plastic hose.

Operation. The hydrojet boat is started by winding a number of turns of string around the grooved pulley and then hauling the twine sharply back through the engine frame.

If you don't want to chase the craft with a rowboat, tether it to a line from five to six feet long. One end of the line is attached to an upright post, the other to the side of the hull nearest the fuel tank. Otherwise pentrifugal force would starve the engine.



Cameras in Tandem Make Big Close-Ups

Any two cameras having double-extension bellows and ground-glass focusing can be paired this way to make super close-ups like the pencil point at right. Extend both bellows fully and remove the back from the front camera and the lens board from the rear one A black cloth is put over joint to keep out light. The result is a bellows length that takes 'em big.—Clorence Leino, West Allis, Wis.

Piece of String **Doubles Scale Capacity**

Even want to weigh a package with an undersize hook scale? It's simple, providing the package doesn't weigh more than twice as much as the scale

capacity.

Attach one end of a piece of twine to an overhead support beside the suspended scale. Carry the other end down through an eye tied to the package, and double it back to the hook on the scale. Let the package slide to the bottom of the line. Multiply the scale reading by two, as the load is shared equally by the scale and the attached piece of string.-Frank Yatsko, Bethlehem. Pa.





Handle-Bar Grips Ease Work with Wheelbarrow

BICYCLE handle-har grips shoved on the handles of a tubular-frame wheelbarrow will cushion your hand against the rough metal and prevent a lot of blisters when hauling heavy loads. Buy grips tailored to fit the hand.-Fred M. Pease, El Paso, Tex

Homemade Jig Balances the Noise Out of Fan Blades In Jig Time

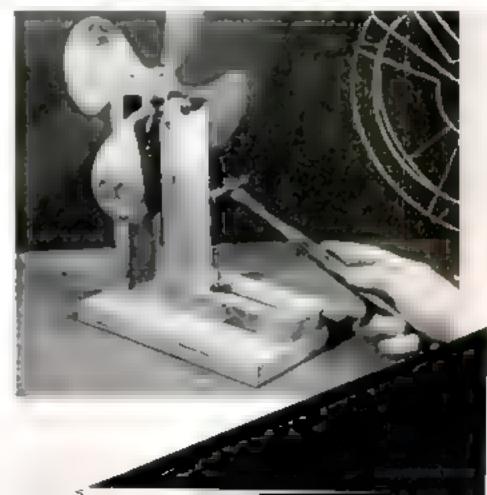
Your fan will keep you cool with less noise if you balance the blades to reduce or eliminate vibration.

Motor resistance may make this difficult when they're mounted, but it's easy to make a balancing jig. At one end of a wood base, mount an upright slightly taller than the radius of the fan. Fasten a sımılar upright to one end of a slotted strip secured to the base by a bolt and wing nut. This permits the spacing between the uprights to be varied. Astride a centered notch in the upper end of each upright mount a pair of roller bearings.

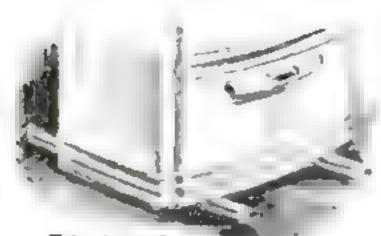
To balance the fan blade, rest it on the bearings on its own shaft or a piece of straight drill rod of the right diameter. If there is a considerable imbalance, the heaviest spot will move to the bottom. If there is only slight imbalance, the blade may not move. Tap lightly and repeatedly on one of the uprights. This will cause the blade

to rotate until its heaviest part is at the bottom.

Achieve good balance either by adding weight to the light or uppermost side-or by removing material from the heavy side. -Walter E. Burton, Akron, Ohio.



10 USES FOR Pipe Scraps



ROLLERS FOR HEAVY ART CLES



5. SHING

OIL HOLE



ARDON OU PLACTIC OR SEAD ENDS TURNED TO A PRECS R.T.



SPACER





FORMING BAR

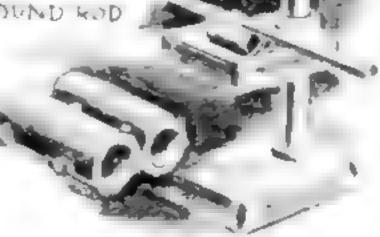
SHEET-METAL

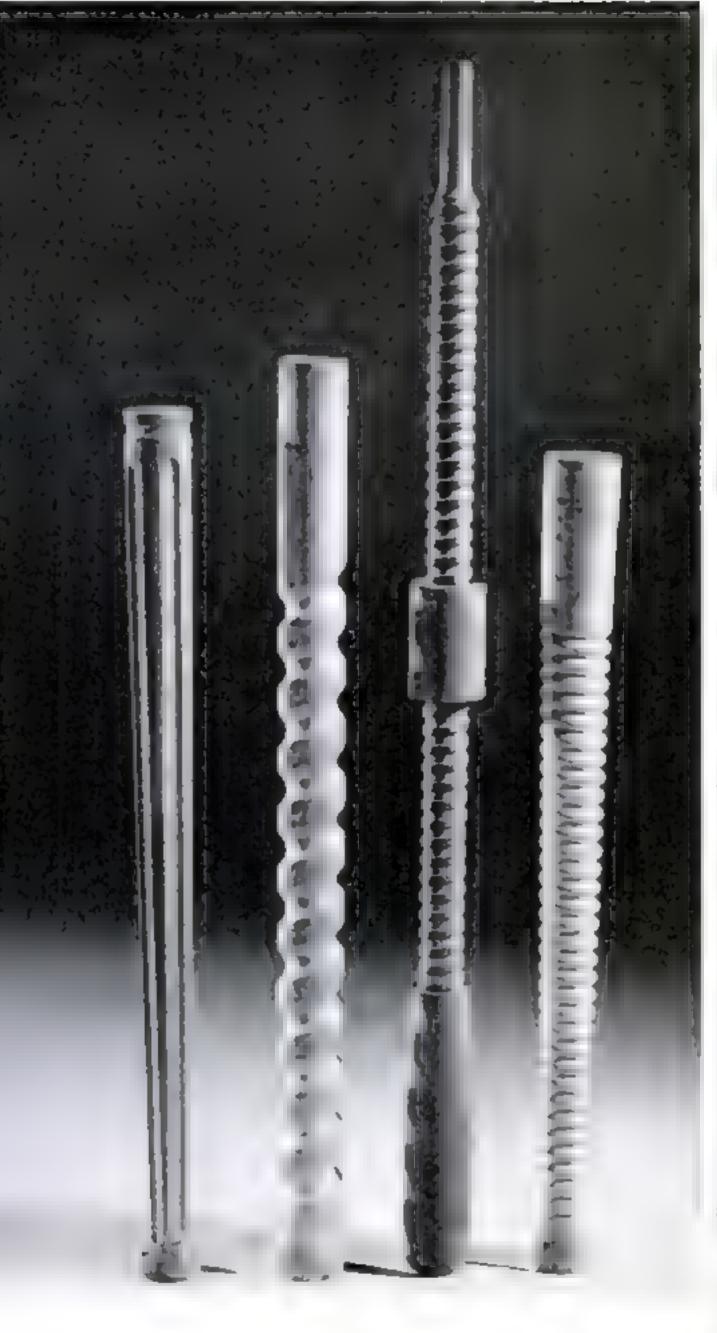
STAFF HOLDER





HOLDER FOR MIRE AND KOUND ROD



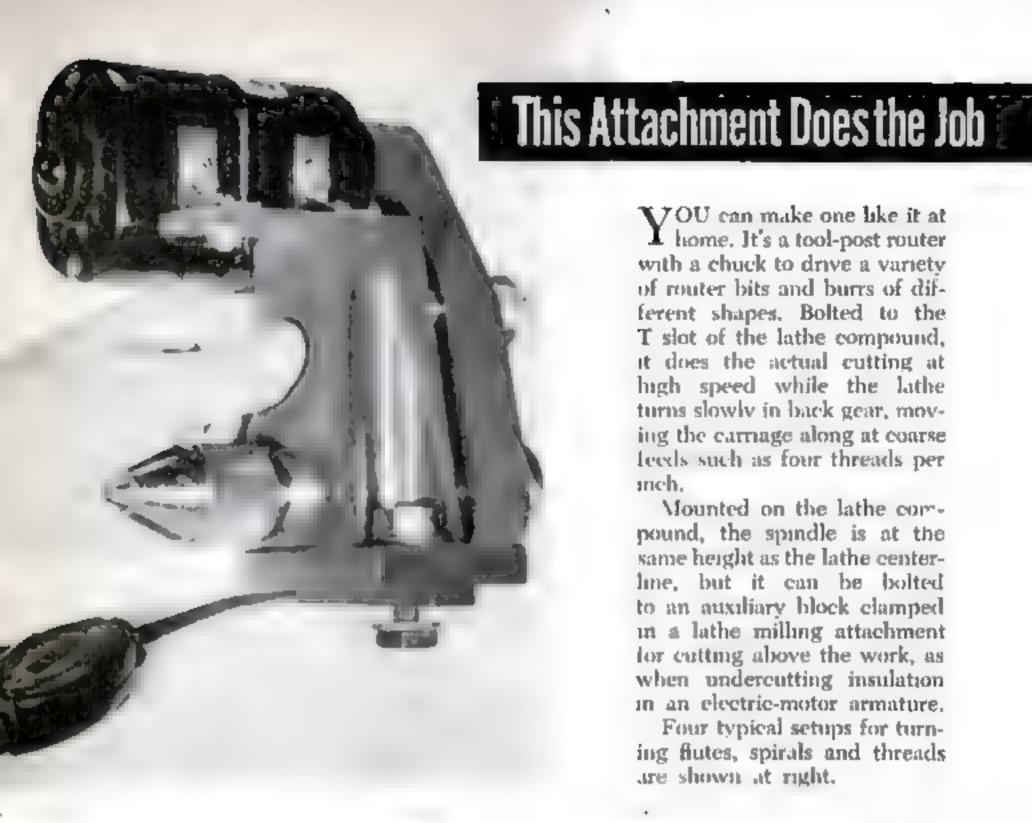


the page to see how you can make some just like them. do by any other method.

By Herb Pfister

TO, THESE were not made by an old-time wood turner-in fact, they weren't made by hand at all. Here's a tip: they were turned on a back-geared metal-cutting lathe, using the lead screw to advance the carriage by power feed. Now all you have to figure out is how such crisp cuts were made in wood with the slow spindle speed of a back-geared lathe. Remember, it takes plenty of speed where the cutter meets the work to shape wood withsplintering it. Think those internal and external Acme threads were made with a big tap and die? Or were they cut with a chasing tool held in a hand that instinctively leads four threads to the inch? Guess again,

Give up? Then turn the page to see how your lathe and a homemade attachment work together to do these and a lot of other trick jobs that would be tough to do by any other method.



OU can make one like it at I home. It's a tool-post router with a chuck to drive a variety of router bits and burrs of different shapes, Bolted to the T slot of the lathe compound, it does the actual cutting at high speed while the lathe turns slowly in back gear, moving the carnage along at coarse teeds such as four threads per

Mounted on the lathe compound, the spindle is at the same height as the lathe centerline, but it can be bolted to an auxiliary block clamped in a lathe milling attachment for cutting above the work, as when undercutting insulation in an electric-motor armature.

Four typical setups for turning flutes, spirals and threads are shown at right.

low to Build the Attachment

CHAPE the lady from a piece of 1%" maple. Dress all surfaces parallel, cut the recess for the clamping bolt and smooth it with a 1"-diameter drum sander in the drill press. Bore sning-fitting recesses for the ball bearing with a circle cutter set to slightly less than the diameter of the bearing's outer race. Clean up the recesses and bring them to the required depth with a flat-bottomed router. Drill a "m" hele through the two recesses for the 2" spindle. Glue body to a T-shaped base cut to fit in the lathe compound

Make the spindle from a 4%" length of 5" rod and thread it in the lathe to match the threads of the chuck you're using. Turn and fit the handwheel, step pullevs and collars, and assemble the spindle on two 3"-bore ball

bearings pressed into the recesses.

Glue a %"-thick block of maple to the top of the body and fasten a sewing-machine motor to it with two steel angles. Check the rotation of the motor: it must run counterclockwise to turn the spindle clockwise, seen from the handwheel end. If necessary, reverse its rotation by switching the wires leading to the brush terminals.

meh.

A round rubber sewing-machine belt drives the spindle. Cut the belt guard from a strip of \$" maple and fasten it over the pulleys with a thumbscrew and a K" stud driven into the side of the body.

Bult the attachment to the lathe compound with a " bolt and a washer filed to fit the T slot, and give it a trial run before painting. Finish with a coat of shellac followed by a coat of machine-gray enamel.

For use with the lathe's milling attach-

CUT BEARING RECESSES with a circle cutter. Make trial settings in scrap wood for a tight fit. Remove center material and bring recess to depth with a flat-bottomed router.



176 POPULAR SCIENCE



FLUTING. Tapered turnings, made with tailstock set over, are fluted with round router but chucked in attachment. Compound is set at 30° angle to let side of router do the cutting. Flutes are cut in several successive passes.

straight into work. Carriage is moved by lead screw with gear set up for coarse feed of four threads per inch Lathe spindle is turned at slowest book gear speed so cutter can work.

THERADING. Four-threads-perinch Acnie thread is cut in hardwood dowel with 's"-diameter
flat-bottomed bit. Touch with
steel wool to smooth the cut.
Pieces like this let you make
your own cabinetmaker's clamps.

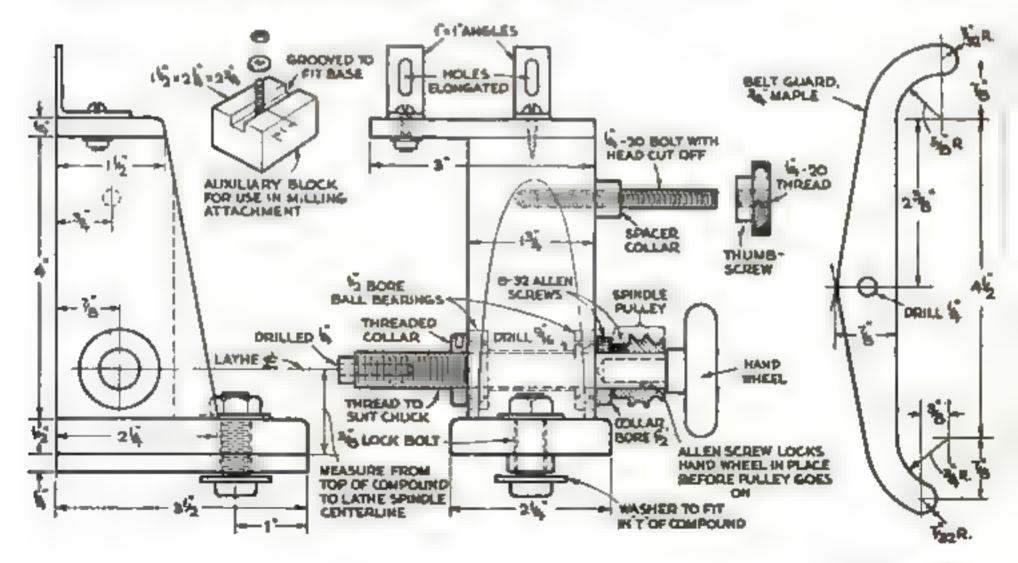
internal threading. One of the hardest jobs in woodworking, this is easily done with a threading bit, made from ½" brass rod and ½" drill rod. It chews out Arme thread that exactly matches threaded dowel.







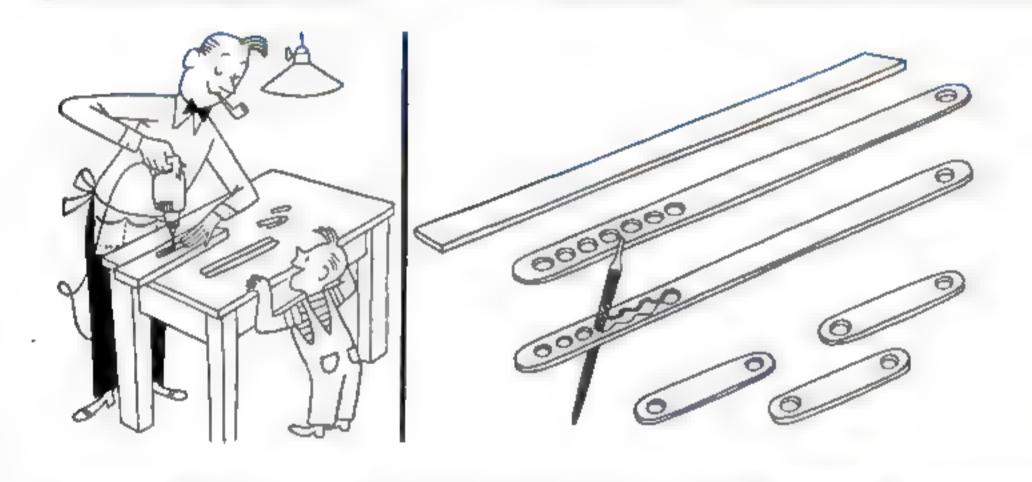
ment, make an auxiliary block of maple with a groove down its center to fit the T base of the spiral cutter. Bolt the cutter to this block and clamp the overhanging end in the jaws of the milling attachment. This permits vertical adjustment of the cutter as well as the horizontal motion provided by the compound.

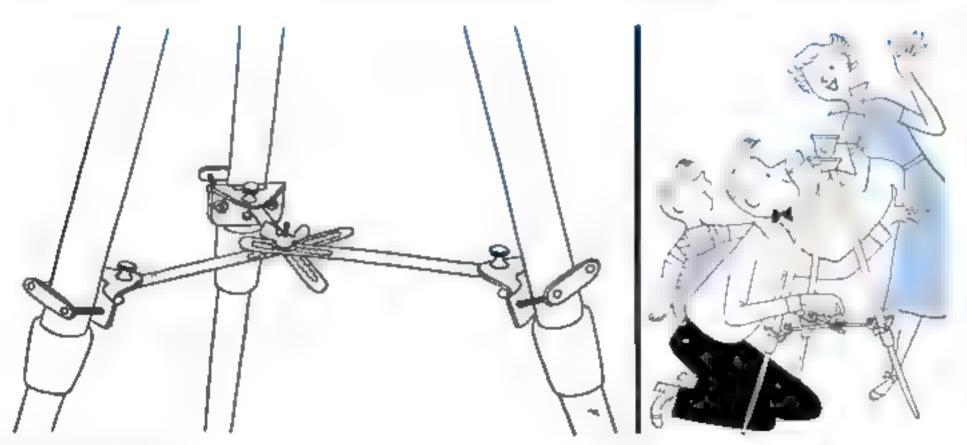


By Roy Doty and Robert Hertzberg

Workshop





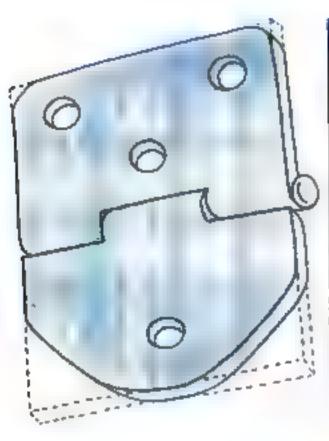


178 POPULAR SCIENCE

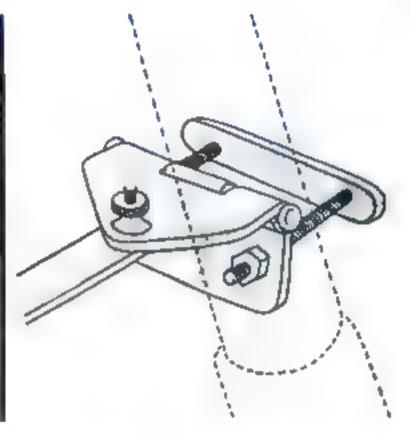




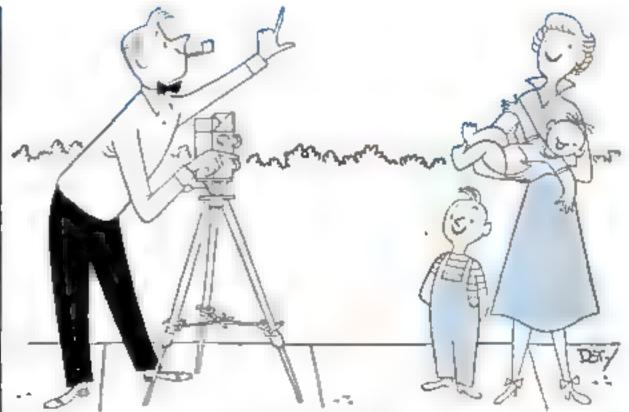












Next Month: A sewing kit for the housewife.

AUGUST 1954 179

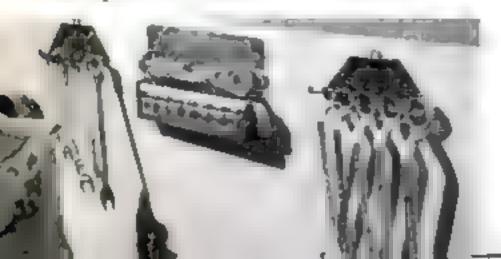


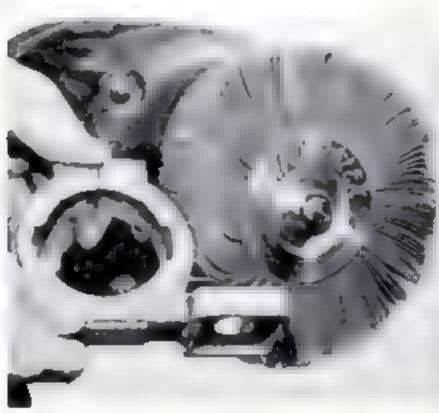
1. Calibrator Figures Rafter Lengths. Knowing the pitch and run of a roof, you can quickly determine the length of hip, common or valley rafters. A calibrated scale transposes the run into feet of climb according to the pitch. You can get the rafter length by stepping off the dividers.



Rule Has Swivel Tip. Instead of remembering to deduct 1/32" from an inside measurement made with most hook-tip rules, just swing the tip of this one out of the way to bring the end of the rule against the work. The rule can be had in lengths up to 10 feet and has a tape lock.

4. Holders Hang Wrenches on Wall. Each of these wrench sets is packed in a holder which can be screwed to the workshop wall, displaying the tools for quick selection. A wide assortment of box, socket and open-end wrenches is available.





2. Flexible Grinding Wheel Smooths Contours. Hundreds of abrasive-cloth leaves sealed to a hard core present a continuous but flexible abrasive surface to metal parts, Using it, there is no danger of digging in. as with a hard abrasive wheel. It comes with arbor and centering flanges for use with a motor or flexible shaft.



Handles. These holders for files and sandpaper have two handles for accurate and comfortable working in any position. Files are interchangeable and are made in a vanety of patterns. Sandpaper is applied to a cushion on the sanders with a pressuresensitive adhesive that lets you peel it off easily for quick replacement.

Eurther information on these tools can be obtained from 1. Meers Rudden Co 6524 East 4th Place, Tulse, Okra,; 2. Merst Products, Inc 4023 Irong Place, Culves Cuy, Culy; 3. Moster Rule Mfg. Co., 40 Mulberry St., Middletown, N 1; 4 Indestro Mfg Corp., N Kildare at Schubert, Chicago 39, Ill., 5. The Milwankee File Co., 1567 W. Pierce St., Milwankee 4. Win.



Farmer-welder-inventor P. J. Crews has 'em coming from hundreds of miles for his home-grown farm equipment.

By Murrelle Mahoney

If YOU asked P. J. Crews of F tzhiigh. Okla, whether he is a farmer or welder he probably wouldn't know P. J. works at both so successfully that he belies the old saw about Jack-ot-all-trades, master-of noise. And the welding trade comes in mighty handy around a farm.

There is always some kind of tinkering to be done, some piece of machinery that needs a bit of fixing. But his real specialty is the original,

practical equipment that he designs and turns out in his farm welding shop.

Crews builds cattle guards, metal ranch gates, special types of cattle feeders that don't waste feed, fancy aluminum truck canopies for transporting Shetland ponies. County residents have grown accustomed to seeing his truck coming down the road carrying some peculiar-looking contraption or other. They usually stop to give Crews' latest brain child the once-over.

When he first set up his shop, a few years ago, so many of his neighbors came around wanting something repaired or built that he now devotes most of his time to jobs for other people.

Just What the Doctor Ordered

During the war he even turned his craftsmanship to further the cause of medicine. When fine-tempered steel was hard to get, a bone surgeon in Oklahoma City, where Crews was working in a blacksmith shop, came to see him. His delicate bonescraping tools were wearing out; he wondered if Crews could copy them.

This is the fourth of a series of articles about outstanding home workshops, from which everyone who has a shop may pick up a few helpful pointers.

See POPULAR SCIENCE MONTHLY next month for a story on another fellow's shop.

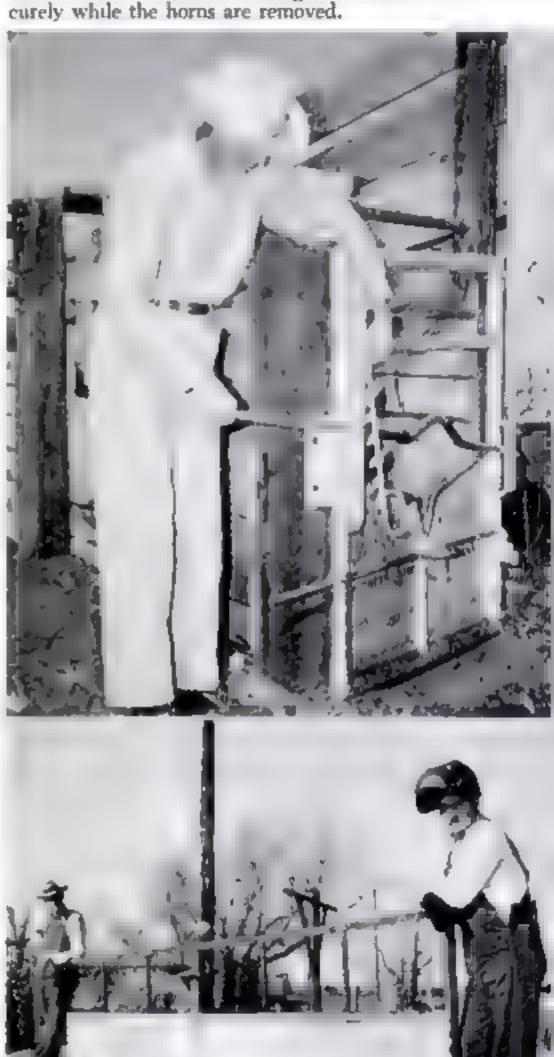
"I told him I'd try," says Crews. "They must have been all right, because he came back twice and ordered a dozen more each time."

Lately, however, he has stuck to farm equipment. His current specialty is a V-shaped aluminum stock feeder with trays that catch feed dropped by the cattle. These have proved to be much in demand. With several hundred cattle to feed, ranchers can speed up chow time. Another type of feeder consists of two metal sides, each 20 feet long. The bottom half is sheet metal, and the top is made of open frames at feeding height. Baled hay is placed between the two frames and some 28 or 30 cattle can feed at the same time.

Another unusual item he makes is an aluminum covering for a pickup truck, with a gate and partly open, barred sides for making pony transfers after a sale.

"Most metals absorb heat, and livestock

Cattle dehorning is speeded up by this welded gate device In his right hand Crews is holding the rod that adjusts the height of the neck yoke, or clamp. The lower bar, also adjustable, fits over the nose, thus holding the animal securely while the horns are removed.



Finished side frame of a cattle feeder that is shown being welded in photo on preceding page. When completed, the feeder will have two such sides and two ends. Closed-in bottom part is for feed, open top for bossy's head. Crews' welder-assistant, Jim Holkum, is at right.

Pony tie rack is an original Crews design A concrete-block base, buried in the ground, makes a solid anchor for the metal center post. The large aluminum bitching ring allows the pony freedom to move about a bit when a slipknot is used on the halter rope. On examining the rack, a recent visitor from Texas, a pony breeder, remarked. "I never sew one like that before." Crews chuckled and agreed, saying, Neither did I." Before the Texan left he ordered two of the gadgets. Originality in design is the best salesman Crews has



V-shaped feeding trough is made of aluminum, except for the side catch-all trays. These are oil drums, split down the middle, and serve to collect feed dropped by careless caters. The feeder, 18 feet long, can accommodate about two dozen cattle without crowding.

The fighting knife Crews is holding, made of automobile-spring leaves, is called the Paul Jones, after his given names. During the war he made them for soldiers in his Oklahoma City welding shop. Locomotive-spring leaves were the raw material for his butcher's cleavers.

Shetland ponies travel in cool comfort under this shiny, heat-reflecting aluminum canopy designed by Crews to fit the bed of a pickup truck. The aluminum top is expensive, about \$300, but then some of the ponies that he raises are worth as much as \$6,000.



Children's playground equipment also comes from the farm welding shop. The tester totter is built for toddlers as well as for longer legs. It is easily raised to a higher rung of the ladder. The swing behind it is foot-pedal-operated by one or two youngsters.

184 POPULAR SCIENCE

hauled in summer in ordinary trucks are half cooked by the time they reach their destination," Crews explains, "But aluminum, which reflects heat, makes it much more comfortable inside. You can haul stock for miles under that cover and they keep cool as a cucumber."

Educated Cows Answer School Bell

Used oil drums, pipe, old sucker rods from the oil fields, any useful metal, is grist for his mill. When he needs something to work with that he can't find around, he advertises to buy it. He once advertised for 10 old school bells. Asked what for, he said that he had bought one for himself, set it out on a metal post and used it as a dinner bell for the stock.

"You can train pomes or cattle to come in when you ring the bell," he explains. "They get used to hearing the same kind of noise every day." He laughs. "I guess that's what you'd call an educated cow, if she'll answer the school bell."

Neighbors and some "drop-in" customers from Texas saw the bell and liked the idea. Crews didn't want to sell his, so he thought he'd better buy some more school bells and fix them up.

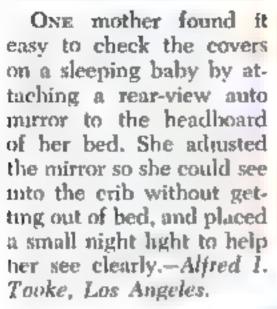
Crews just can't seem to stay out of the welding business. For years he was a welder in the Frisco Shop in Oklahoma City. He went out on his own in 1943 and opened his own shop. Then, in 1945, he decided to take up farming, bought some land and located at Fitzhugh. The next year he started breeding Shetland ponies, and now has a herd of 30.

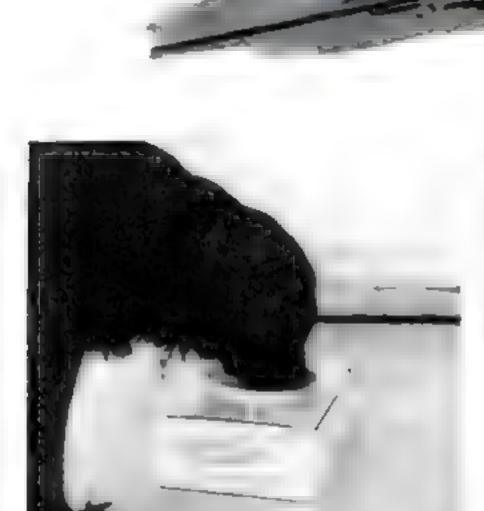
Neighbors Put Him in Business

When he got out his welding equipment to do a few jobs for himself around the farm, neighbors came around with various tinkering jobs they needed done. It was so handy not to have to go into town for the work. The next thing he knew, the business had grown until he decided to set up a real shop. He is perfectly content whether building things on order or just earrying out whatever ideas come into his head.

He even has a neighbor weaned over into the welding trade. Jim Holkum, who farms near the Crews place, never had a welding torch in his hand until two years ago. Now he is a full-time worker in the shop, and the two of them keep busy. As long as Crews keeps cooking up ideas, it looks as if they'll stay that way.

Rear-View Mirror Helps Mother Keep Tabs on Sleeping Baby





No Tipping Allowed Here

To keep a dog from upsetting his food bowl, cut a hole in the bottom of a flat cardboard box like this and force in the bowl until only the rim shows. -Glen F. Stillwell, Manhattan Beach, Calif.

Vibration Starts Ink Flowing

If you have trouble starting the ink in a ball-point-pen refill, run the point along the serrated edge of the cutter on a box of waxed paper.

This sets up vibrations in the ink chamber, settling the ink and permitting it to flow.—Ken Murray, Colon, Mich.



Sailor Turns Peanuts into People in Miniature-Sculpture Hobby

With E serving in the Navy, John Bakowski of New York City filled between-duty hours by fashioning peanuts into people and various other creatures. Finding the right shape of peanut took the longest time, he says.

AUGUST 1954 |85





TVF ure Tubes' 5 Common Troubles

Unless Junior takes a hammer to it, your TV picture tube will expire for a predictable reason. A servicemen tells how-come.

By Art Margolis

THOSE who gaze into the TV crystal ball predict that some 4,300,000 picture tubes are going to require replacement within the next 12 months, yours possibly among them.

As a TV serviceman, I'll be called upon to haul away many of these glass corpses, and I know from experience that owners will want to know why—especially since replacements cost from \$35 to \$100.

A multitude of catastrophes can befall a picture tube. However, five troubles pretty well cover the field. (Of course, other troubles in the set itself can cause many of these same symptoms; don't throw out that expensive picture tube until you are sure.)

Open filaments. This is the first and most prevalent electronic affliction, and I never know where I will come across it. One day I was called to a prison. The customer was the matron.

The sound on her set was okay, but there was no brightness on the screen. Examination disclosed a bad picture tube. The reason? Open filaments.

But the matron had an "I'm from Mussouri" look, so I invited her to crouch beside me while I pointed to the neck of the picture tube protruding from the rear of the set. I explained that normally there is a tiny glow in the transparent glass neck, but in

this case the bit of illumination had been extinguished. Just as the filaments in a light bulb burn out, these filaments in the picture tube had opened up. When electricity is pumped through filaments the current makes them do two things, First, they get very hot. Second, they throw off a bright light. In a light bulb we are interested only in the light. But, in a television tube we want heat. In fact, the only job the filaments in a picture tube are required to do is to give off an intense, concentrated heat. That's why they're called the "heaters."

Low emission is another frequent picture-tube disease. I remember a case that occurred in a cheap, run-down hotel. The television set was located in the lobby.

I entered in the middle of a movie. The shades were drawn and the lobby was dark. The only light came from the TV screen—if you could stretch a point, for the cowbov actors looked as if they were galloping around in the darkest part of the Calcutta hole.

The filaments were okay in this tube. But surrounding, although not touching, the filaments is another element, the cathode. The job of the filaments is to radiate heat to the cathode. Thus the cathode becomes hot, and due to a special barium oxide coating, spits forth a beam of murderous raw electricity into the vacuum of the picture tube and on into the phosphorous coating on the picture-tube face. The phosphorus reacts by becoming agitated and glowing. We see the glow as brightness on the screen.

Now the question: why the lack of brilliance on this screen? The interior of the picture tube is supposed to be a vacuum, or as close to a vacuum as possible. However, gases collect inside the tube as a result of the electron beam bombarding the metal structures in the tube and vaporizing some of the subsequent chipped-off metals. The gases also come from small deposits of gas that are actually dissolved in the glass or metal picture-tube shell. Anyway, over a period of time these gases collect in suffieient quantity to poison the cathode and reduce its ability to shoot electrons. Also, these gases float around in the vacuum obstructing the cathode ray.

Here in the darkened lobby, the small group was watching a tube with a cathode that could not emit a strong electron beam. The electron ray barely excited the phosphors, and the coating would not take on a bright shine. Turning up the brightness control would only make the whites in the picture begin to shimmer like sparkling quicksilver and then the picture would turn uside out, like a photographic negative. A new tube was the only solution.

Open grid. One evening I was summoned by a young fellow fresh from Scotland, burr and all. I inspected his receiver and noted the symptoms: brightness but no picture

Brightness is simply the light on the screen, but the picture comes from the various shades of black to gray to white. After the electron ray leaves the cathode and heads out into the wide-open spaces of the picture tube, the ray comes to another element in the structure of the tube, the control grid.



The lady had an "I'm from Missouri" look.

This grid governs the stream of electrons. If the voltage on the grid is strongly negative, it can exert enough force to keep a lot of the weightless electrons from getting to the phosphor screen face. On the other hand, if it is less negative, it will not be able to stop any of the electrons from speeding to their destination.

It follows then, where only a few electrons make it to the phosphor, the phosphor will be barely perturbed and glow only a time bit, giving a dark picture. However, if a horde of electrons swarms all over the phosphor, the phosphor will give a bright picture.

The control grid is fed with the picture information in the form of a voltage that



"I'll watch forr a week orr two," he said.

varies with the brightness of the picture being received. This changing voltage makes the control grid either stop the electrons or let them fly in full force, causing light spots and dark spots on the phosphor screen face. These add up to the television picture that you see.

This hapless tube had a busted control grid. With the open grid, there'd be no "Lucy," even though there was plenty of brightness on the screen.

My Scottish customer was taken aback at the disturbing news, but after making sure of the price he gave me the job. He watched me closely while I installed the new tube. As I was leaving he said, "I want to give you something extra forr yourrself I think you do verra good work, so I will watch the television forr a week orr two and if it plays well, I'll call you on the telephone and you may stop back for the tip."

Fixed brightness. This comes from an internal short in the electron gun, the term designating all of the elements in the picture tube: filaments, cathode and control grid, plus one more element, the accelerator

The gun operates like this: The filaments heat up the cathode; the cathode, when hot, gives off an electron-cathode ray. the ray reaches the grid, and the grid inserts the television picture information into the ray. At

that point, the accelerator takes the cathode ray and accelerates, or shoves, it out into the picture-tube vacuum. Fixed brightness occurs when any or all of these four elements physically touch each other.

In addition, there are bright horizontal hoes through the picture which remain uninfluenced by the brightness control. Turn the control all the way up or all the way down-the picture remains at a constantbrilliance level. Remedy: a new tube.

Open cathode, I come across lots of old acquaintances and friends in my TV service travels. One customer, a lady, turned out to be an old Junior High School science

teacher of mine.

I turned on the set and noted that there was no brightness at all. The filaments of the picture tube were lit, so I checked to see if any high voltage was being produced by the set. When the electrons leave the electron gun, they are shot towards the phosphor screen face. But they would never complete the journey with enough energy if it weren't for the high voltage. Between 10,000 and 15,000 volts is applied to the outer shell of the picture tube, and this has the ability to suck the electrons violently toward the screen face and dash them against the phosphors.

There was plenty of high voltage here, but there still wasn't any brightness on the screen. I discovered that the internal connection to the cathode of the picture tube was cracked open and would not allow the picture tube to accept the high voltage the set was producing. For the picture tube to be able to accept the high voltage, a complete circuit must be made between the cathode and the shell of the tube. With an

open cathode, the circuit was broken of course

I stood up and informed my old seltoolmarm that her TV set had a bad picture tube. Then she, using the same inquisitorial tones I remembered from eighth grade, asked me why.

A few days later I received my check. In the envelope was something else-a report card with my name and one subject typed neatly on it. The subject: "TV Service." The grade: "A."



Unlike school days, I was prepared.



Ink Stains Filler to Order

COLORED waterproof drawing inks, available at art-supply stores, will stain natural-color plastic composition wood to match the surrounding woods.

A wide range of shades can be obtained by mixing brown, yellow, red and black inks in different proportions. Apply with a soft brush after the composition wood has hardened and been sanded.



Lock "Kid-Proofs" Appliances

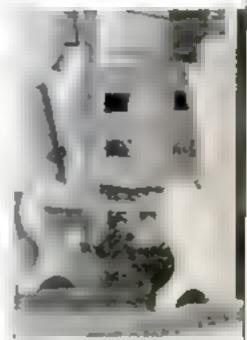
Inquistrive youngsters can't plug in a tool or appliance if you slip the shackle of a miniature padlock through one of the holes found in the prongs of practically all male electric plugs. Padlocks of this size are generally used for dog collars and mailboxes.—Sid Corlin, Chicago.

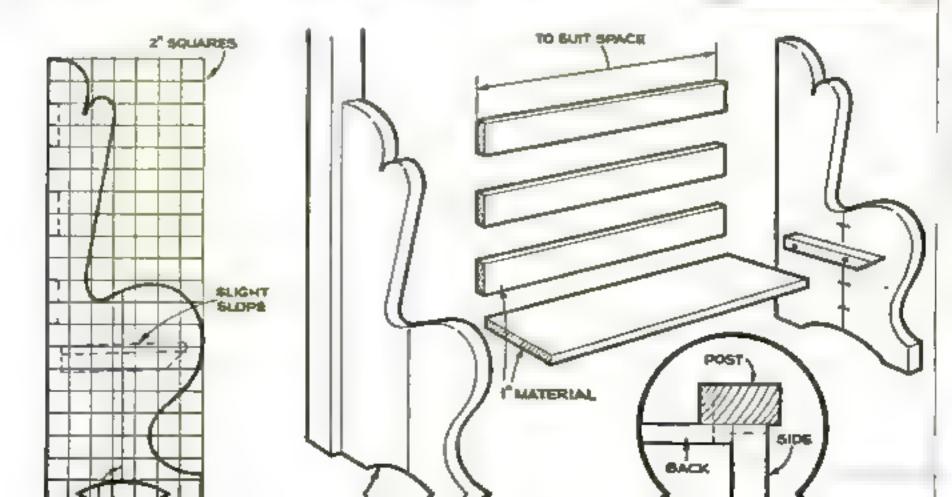
Dutch Seat Provides a Dressy Touch for a Small Porch

- Тпоисн it may never be used for lounging, this attractive Dutch seat will make your front porch look warm and inviting.

Lay out the profile of the sides on a sheet of wrapping paper ruled into 2" squares and transfer the pattern to the wood. Use two pieces of two-by-eight glued and fastened together with cornigated nails to make the board width needed for each side. Nail the seat to cleats screwed to the sides and nail three one-by-four strips in place for the back rest. Note that the cleats are attached so that the seat slopes slightly to the rear.

Make the seat about 30" wide if it is self-supporting otherwise make it wide enough to fit between the porch posts, which will brace it and give it the appearance of a built-in unit. Paint it to match the trim of the house.—Hi Sibley, Nuevo, Calif.





How to Build a Tesla Coil





HAVE you ever let 50,000 volts jump

Or seem electric fliencs climb a wine?

Or made a fluori seemt lamp glow by holding it in your hands?

Or built an electric fet motor?

These stunts are a conclust there is a Testa coil in the bouse. One that you can build in a few evenings will do many of the tricks of a million-volt laboratory on a miniature scale.

Nikola Tesla invented the high voltage high-frequency transformer about the turn of the century with the idea of broadcast ing electric power. It worked. From a 200foot-high transmitter in Colorado Springs he lit lamps over a wide area without wires. But since power was radiated in all directions most of it was wasted. The Tesla coil went back to the laboratory

With the age of electronics and nuclear research exclutions oscilloscopes and other inventions called for just the high-voltage radio frequencies lessa's rig generated. The Iosla coil came off the shelt put on working duds, and among other things took as a hon television.

The Tesla coil works on the familiar transformer principle an alternating current in one coil of wire induces a voltage in another coil insulated from but in magnetic coupling with it. A transformer can step vortage up or down. The kind used for toy trans or doorbells steps 115 volts from

the house mains down to a safe 6 to 20 volts. The spark coil in a car-also a transformersteps battery or generator voltage up to 20,000 or 30,000 so that it will jump the

spark-plug gaps.

Voltage gets a big boost. The voltage change is in proportion to the ratio between turns of the input (primary) and output (secondary) windings of the transformer. A Tesla coil has a primary of a few turns of heavy wire, and a secondary of many turns of fine wire.

But what is fed into its primary isn't ordinary AC by a long shot. In the coil shown, for instance, household juice is first boosted to 1,500 volts by an ordinary radio plate-supply transformer. Then this is converted by a one-tube oscillator to a 475 kilocycle frequency (just off the long-wave end of your radio dial). That's what goes into the Tesla primary.

What appears on the secondary seems out of this world. You can't fence it in: it jumps off any edge or point as a fiery brush. Spectacular in appearance, this corona cau create enough heat to melt metal and, if concentrated on a sharp point, generates an air blast strong enough to spin a light wheel

or blow a candle flame

It has two other weird properties-skin effect, and radiation. Household current strikes right through the human body. But Tesla currents oscillate (reverse themselves) so fast that they travel only on the surface of conductors. They go only skin deep; you don't feel a thing.

Such fast oscillations also radiate into space. They can be detected by a receiver tuned to their frequency, and will light neon or fluorescent lamps feet away. Some

ELECTRICAL PARTS LIST

freler to circuit diagram for symbols)

L1: RF transformer primary (see text) L2 RF transformer secondary (see text)

C1: 700 mmfd., 5,000-peak-volt mice capacitor, Sprague 2MC or equal

CZ same as L1

(3 500 mmfd., 5,000-peak-volt ceramic or mica C4: 5,000 mmid., 5,000-peak-volt mica espacitor, Sprague 2MC or equal

R1: 2,500-ohm 20-watt wire-wound resistor

T1: 6.3-volt, 4-ampere, 2.500-volt insulated filament transformer, 115-volt primary, Stancor P 4019 or

T2- 7:00-0-750 wilt 250 m.a. plate transformer, 115vols primary, Stancor PC-0334 or equal

St. S2 SPST toggle awatch

V1: 811-A vacuum tube I ceramic feed through insulator, ICA #2305 or equal

HARDWARE LIST

14 lb. #32 coston-enamel 'neulated magnet wire 50' #12 enameled copper wire

1 4 pin tube socket, Amphenol 49 RSS4 1 9 16" plate rup, Millen Wandill or equal

i alligator clip, R.A #884 or equal

25' #16 stransted bookup were insulated for at least 2.000 volta

15' 2-conductor "zip" cord

1 2 pole line plug 30" length of Bakelite 1/16" wall tubing, 2" outside

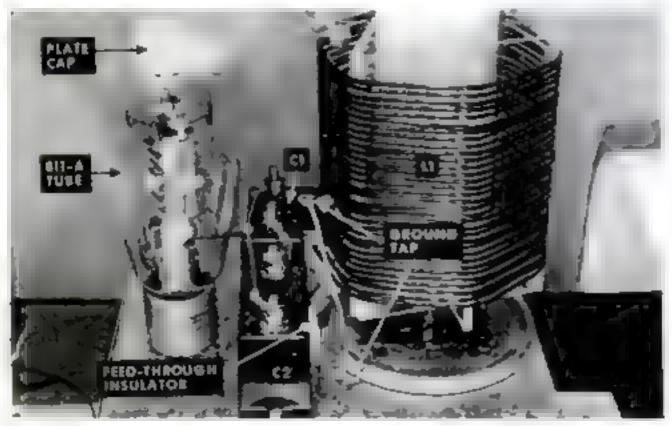
diameter, Insuling or equal-I pe Plexiglas 516" by 14" by 16" thick

l oz. cement for r'lexiglas

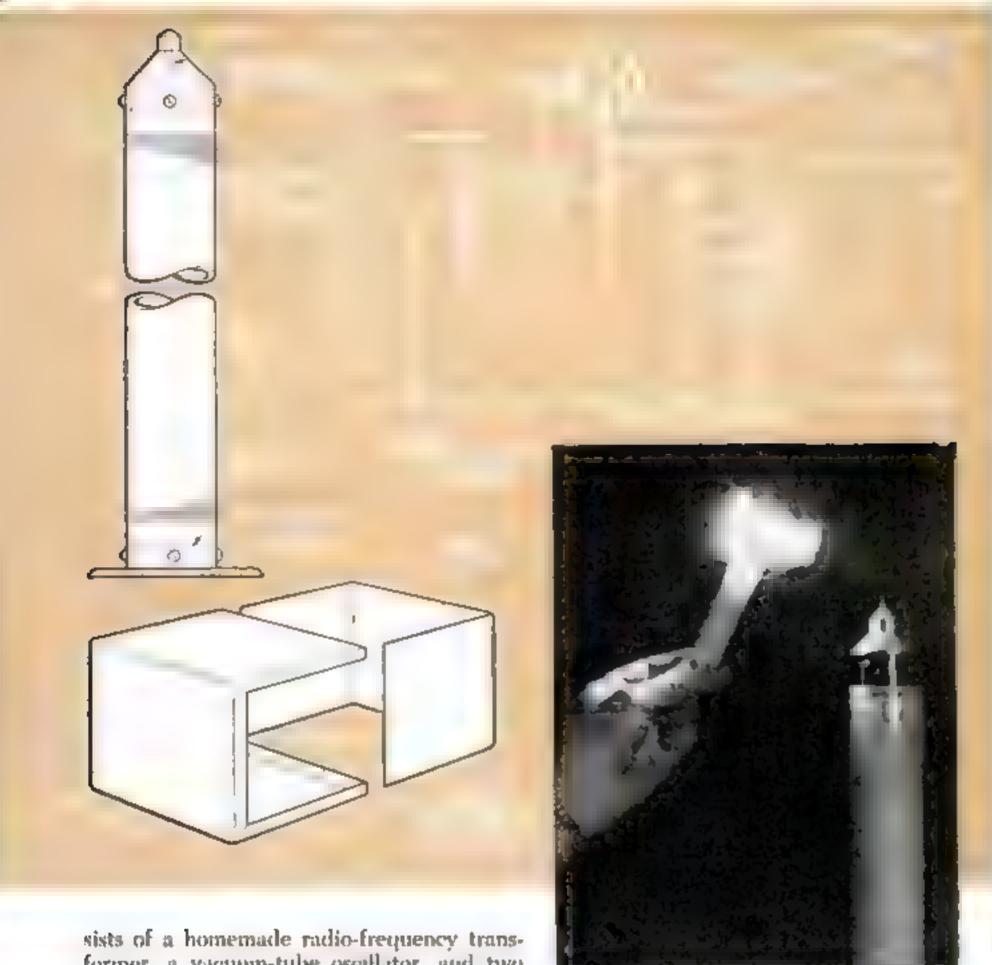
1 pc 22-gauge galvanized steel or aluminum 24" by 24", or box about 7" by 8" by 8"

Mocellaneous luga, acrewa, nuts and sheet-metal ecrews, metaltic household rement or cold autobody solder, plywood, 2" funnel

of these effects are shown in the photos. Ordinary bench tools are all you need to build the Tesla coil shown. The outfit con-



TOF-DECK WIRING ADONS the ground tap of the Tesla primary soldered to a lug that is clamped under one flangemounting screw. The outside terminals of Cl and C2 are joined by a jumper and connected to the upper terminal of Ll. Inside terminals are also connected and go to the feed-through insulator and bottom terminal of L1. Use No. 16 stranded flexible wire for the tube-plate cap, cutting it just long enough to reach without stretching. See text for how to "fire up."



sists of a homemade radio-frequency transformer, a vacuum-tube oscillator, and two ordinary radio power transformers for plate and filament supply. Parts are available from any amateur radio or experimenter's supply house, although the 30" length of Bakehte tubing may have to be ordered. You can save money by shopping for surplus or using scrap-box parts, but stick to the ratings and values given.

Safety is built in. Although Tesla current is harmless, the intermediate power supply can dish out a nasty jolt. Therefore the rig is designed so that exposed parts are either grounded or carry only radio frequency, which may cause a slight burn but cannot shock.

The transformers and other "hot" parts are mounted inside a sheet-metal box. You can make this from galvanized iron or sheet aluminum by bending it up as in the draw-

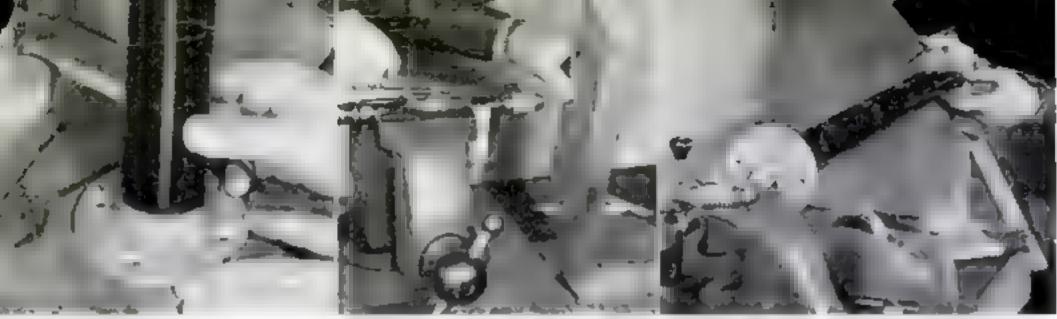
ELECTRIC WIND. On a sharp point, charge density is so great that it electrifies air before it. The effect is that of a strong air jet, shown blowing a candle flame.

ing, or use stock cabinet of similar size.

Because radio frequencies call for special handling, all top-deck wiring should be No. 12 solid copper, well-soldered at connections, and kept as short as possible. Use lugs to connect wires to terminals. The inside wiring should be No. 16 gauge or heavier, with rubber or plastic-and-fabric insulation rated for at least 2,000 volts.

Brand names are given in the parts list as a help to identification. These happen to be the parts I used, but any make of equivalent quality will do.

[Text continued on page 196]

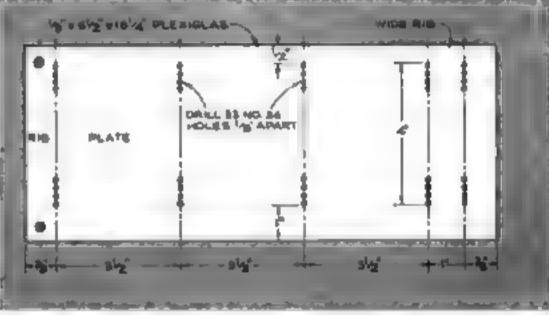


thick plywood to fit tightly inside the Bukelite tube. Saw a 4" disk of thinner plywood and attach one plug to it with four wood screws from beneath. Drill and countersink four mounting holes in the disk. Shellac wooden parts before fustening to tube.

2. FOR YOUR WINDING MACHINE, clamp a hand drill in
a vise, parallel to the beach
top, using blocks to give the
jaws a firm grip on the drill.
Bend up a piece of heavy
sheet metal as shown (or fasten an upright piece to a
block of wood). Chuck a No.
25 drill and drill a hole in
the upright like this.

from the end of the drill chuck and in line with it. Clamp a brace from upright to bench. Fasten one plug into each end of the tube with small wood screws. In the center of the base flunge, drive a 2" No. 14 screw. Cut off its head and chuck the shank. Drive a screw through upright into center of the other plug.





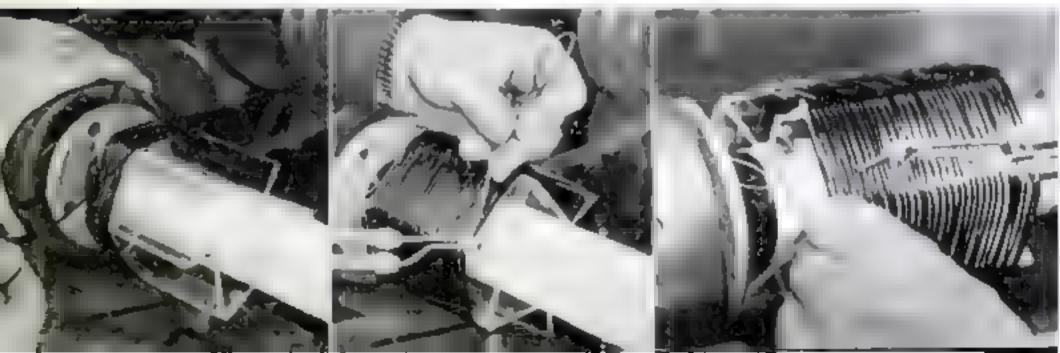
7. BUILD A FORM from three plastic plates and three ribs, having notches to wind the wire of the primary coil. Lay out the parts as shown in the drawing (right, above), making the inside rib 1" wide, and the two outside ones only 3%" wide. Carefully mark the

No. 36 holes 1/4" apart. If you drill them by hand, lightly center-punch each one accurately. On the drill press, a wooden fence clamped to the table, with a locating pin 1/4" from the drill point, can be used as a guide. Run the drill fast but feed down slowly so as not to chip the plastic.

der one end of the No. 12 wire to a lug and fasten it under the lower terminal screw. Then turn the base flange by hand to wind on the primary in the same direction as you did the secondary, laving one turn of the heavy wire into each of the 33 notches all around.

11. SOLDER THE END of the last lug to the top terminal lug. Use a hot iron, make the joint as quickly as possible, and clap a damp rag onto it to reharden the plastic, which will have softened from the heat. Now apply more cement along all the plate and ribedges to set the wire turns, making certain that each is in its own notch.

12. SCRAPE THE INSULATION off the eleventh turn from the bottom of the coil. A narrow strip of sandpaper pulled between both hands will get under the wire, Push spart adjacent turns a bit if necessary. Then loop the tail of a lug around the bare wire, solder it to this bared turn, and push the spread turns back. The finished transformer can now be removed.



he would walk along New York's waterfront, then swarming with sailing vessels. The grant 10-story-high windjammers from the ports of the world, their canvas spread out, thrilled the youngster. One day he'set up a tripod and shot a ship silhouetted against a sunrise. It won a \$5 prize, parental approval and a year's subscription to an

early photo magazine.

After working during several summers for a commercial photographer, Morris Rosenfeld became one of the country's first press photographers. As photoengraving was in its infancy, Rosenfeld's photographs were often used by artists as a basis for drawing news illustrations. During his newspaper career he set up his tripod at some of the top news breaks of the time: the Russo-Japanese peace conference, Admiral Dewey's parade, the great Baltimore fire. Once Rosenfeld rushed to an editor with a colossal idea-to shoot the Wright brothers as they attempted to fly at Kitty Hawk.

"Rosy, you're absolutely crazy," the editor scoffed. Rosy didn't get his scoop

Boating Is Big Business

Along with general news, Morris Rosenfeld always kept close to his boyhood loveboats, From 1898 on, he shot the Lipton International Cup Races, as well as thousands of other minor regattas. In 1920 he dropped general news free lancing, and shot boats exclusively. Today he is riding the crest of a boating boom. What used to be a sport of the leisured few is now a major recreation. It takes in Texas cowboys, Minnesota machinists, New York accountants, housewives in Arizona. Pleasure boating is a fabulous 600-million-dollar annual business (5,000,000 boat owners—yachts to peanutsize prams).

And riding the crest with him are two of his sons, Stanley and William, who also are photographers. (A third son, David, teaches photography in a New York vocational

high school.)

"It's easy to see why boating is becoming more popular," says Rosenfeld. "It's a sport the whole family can enjoy together, there are less-expensive boats available today, and there's lots more room on the water than along crowded highways."

These new boating enthusiasts now go down to the sea with cameras as well as box lunches. For them, Rosenfeld offers a few photographie tips:

NG SPINNAKERS, a Rosenfeld masterpiece, is probably the best-known boat photograph

ever made. It was anapped in 20 minutes, has paid him handsomely in royalties.

 On shooting action: "To get boats in speed racing, you have to shoot fast enough so that the picture is not blurred, but not so fast as to freeze all action, making sea spray, for instance, appear as a mass of individual droplets,"

 On lighting: "You have to keep your eves pecled for variations of effects. It is 360 degrees around the horizon, so place the boat in a part of the sky where you can use the direction of the light either to silhouette the subject or for modeling to bring out shape and form, such as billowing sails."

 On lens care: "If you're shooting from a fast-moving boat and the lens gets wet with salty water, rub it gently with lens tissue; otherwise the salty particles will scratch the lens."

 On filters: "Use medium-yellow ones. They give you the sky tones and will accentuate the clouds. They also protect the lens

against salty spray."

 On shooting within a boat: "Expressions are significant. The hands, bodies and gestures of the people aboard are important. The smaller the boat, the more significant the little actions and gestures. And the best shots are not always the violent ones. A baby sleeping or someone resting in the sun can be equally effective."

Hydrojet Powers Little

Newest thing in nautical propulsion, this clever midget boat has no weed-snagging paddles or prop—won't nip unwary fingers.

By Roy Clough

HERE'S a little boat that skims over the water like a speedy sea sled, riding high on two rocket-like chine planes. Yet when you pick it up you'll find no finger-nipping propeller underneath. The only clue to its hidden power is the intake port on the bottom, and an exhaust port directly behind

it at the stern. Housed in a casing between them is a rotary pump which draws in water and kicks it backward at high speed. Reaction to this stream drives the boat.

The hull. Use %" sheet balsa for the sides, bulkhead, transom (stern), pilot's-head support and chine planes. Thinner balsa serves for the bottom, deck and gunwales, Before decking in the bow be sure to



The machine weighs 86 pounds. Its pilot weighs 210. It flies handily at 25 miles an hour. It will land at seven miles an hour. The thing was built by an engineer-scientist named Igor Bensen. He says that practically anyone could build one. The estimated cost: \$100.

Bensen's aircraft is a sort of Whatzit of aviation. It isn't an airplane-its wings revolve. It isn't a true helicopter-no power is applied to its rotor. It isn't an

Autogiro-it has no propeller.

In flight it looks like a precocious pinwheel or-to borrow a phrase-an agitated palm tree, dwarf size. Its builder calls it a "Gyro-glider." Anyone watching it fly might settle for "rotary-wing kite."

Bensen's Self-Starter—the Wind

It flies, in fact, much like a kite. In light winds, it is pulled aloft by a cable tied to an automobile. In brisk winds, it can be flown by tethering it to a fence post. Slap the rotor to start it, push on the control handle, and up you go.

"Flying this machine," says Bensen, a licensed pilot, "is the nearest thing to flying like a bird that I've ever experienced. There's no structure around you.

There's no noise."

With a 300-foot cable or strong rope, the Gyro-glider can be soared to an altiSHOD SHOES so he can use feet for balance and braking when landing. In free flight, kite will descend slower than a parachute, but it takes practice to muster the single control.



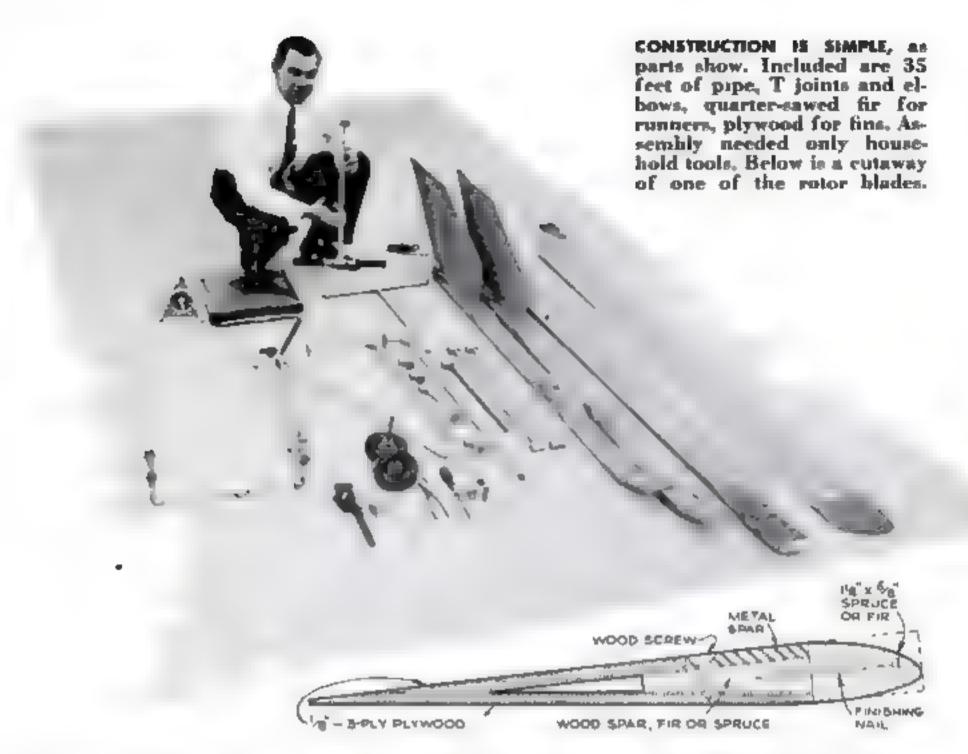
tude of 150 feet, about the height of a 12-story building. But that's tops, Beyond that, the upward pull of the rotor and the downward pull of the tow tend to "buffet" or vibrate the machine and make control difficult.

On Bensen's testimony, the Gyroglider is not hard to fly. Fore-and-aft, he says, it's quite stable. Sidewise, it's something else. It takes practice to overcome the inherent skittishness of the machine laterally. There is only one control for flying. On the prototype gyro this is a yoke, a loop of steel tubing. Whether a federal license will be needed to fly the thing has not been decided.

The lifting surfaces are two long, flexible blades, shaped like those of a heliconter and mounted on a single bearing that lets them teeter-totter in rotating. The teeter-tottering, plus manipulation of the control yoke, balance out the lift of the blade advancing into the wind and the lift of the blade retreating from the wind, Without such compensation,

WATER-PIPE VERSION of helicoptee kite has standard six-inch ball-bearing wheels in front, rollerskate wheels in rear. Bensen is revising undercarriage to make it a threewheeler. Small fins give directional stability. Sent cushion was bought at Sears, Roebuck, Machine's height is 64 inches, width 50, length 80. Weight is 86 lb., rotor diameter 20 feet.





the machine would tend to capsize—the advancing blade creates more lift.

The rotating blades form a disk, slightly dished, with their tips a bit higher than their roots. Centrifugal force wants to hold them straight. The pendulum-like weight of the "fuselage" and pilot wants to dish them. The result is a compromise.

The plane of the disk's rotation can be changed, and that, in fact, is all there is to the control. Push the yoke forward, and the disk tips backward like a straw hat clapped on the back of the head. That makes the gyro climb. Pull the yoke back, and the disk tips forward. That makes it coast downward.

Gyro Lands Like a Plane

Pushing the yoke sideways upsets the balanced lift of the blades as they sweep through the two side quadrants of the circle they describe around the hub. That causes the machine to move sideways.

To land, the machine is coasted to the ground and, in a light wind, "flared out"

like an airplane with the disk tilted back. In a strong wind, the machine is "flown onto" the ground, disk about level, again like an airplane.

Like all blades on rotary-wing aircraft—and like the fixed wings of airplanes, for that matter—that of the gyro is a true airfoil, with a bulbous leading edge, a hump on top and a taper to a knife-edge at the back. The blades lift as they rotate because of Bernoulli's theorem—the air has to speed up to get over the hump. That thins it, and the air beneath the blade pushes up to fill the semivacuum. This upward push is lift.

Wind rotates the blades, as a gust of air will rotate an idle electric fan. The blades can't stop in flight. If the horizontal velocity of the wind doesn't keep them going, its vertical velocity, caused by descent, will.

The real beauty of the Gyro-glider, according to Bensen, is that it takes no precision to build it. The skimpy structure beneath the rotor of his prototype is made of welded steel tubing. But that

on his second machine, put together to see how inexpensively it could be built, is largely galvanized water pipe. His rotor blades are plywood and solid fir, reinforced with a strip of steel an eighth of an inch thick and two inches wide.

To prove that the blades can be built in a home workshop, Bensen made a pair of them with leading edges of ordinary half-round bought at the nearest lumberyard. It worked pretty well, but he isn't recommending it. More care devoted to blade shape pays off in increased lift.

"Eye" for U-Boat Wolf Pack

Bensen's acquaintance with aircrafton-a-string began in World War II when
the U. S. Navy liberated some of them
from the Germans. U-boat commanders
were using them as crow's nests. Paid
out on a cable, the rotary-wing kites
reported by telephone on the pickings in
Allied shipping. This was relayed to the
submarine wolf packs. The kites were
recled in, dismantled and stowed below,
and the U-boats were ready for business.

"Of course," recounts Bensen, Russianborn but U. S.-educated, "the things were typically German—they had aircraft-type controls, flapping hinges on the rotor, and other complications."

Working at the time for General Electric, Bensen built and flew his first gyro in 1945. It did everything the German version would do, and it was simpler Bensen went on to more important research jobs for GE and, later, for a Connecticut helicopter company. But he kept the design of the aircraft-on-astring in the back of his head.

He had a reason. In Hartford he had helped form a model-aircraft club for boys, All the youngsters wanted to fly, but airplanes and gliders were prohibitively expensive. When, finally, he established his own helicopter company in North Carolina, he began designing a tethered rotary-wing machine as a gift to the boys' club.

The gyro is a sideline to Bensen's main business—which is the development of a single-place, military-type helicopter with a novel means of propulsion.



SWIVELING WHEEL on front of welded prototype kite allows steering on ground. Pilot's left hand holds handle to release towing cable. Keel was made from an old ski.



ALUMINUM HUB PLATE secures rotor to shaft. Bearing is floated on a rubber mount to permit tilting for control. Steel-plate portions of assembly were cut from machine-shop scraps.

Yet he takes an open delight in flying the machine and likes to tell about how it cost him money. Before the first flight, his mechanics laid bets on the sly that the thing would never fly. As fast as the money was offered, the engineers covered it. Bensen didn't hear about it until after he had gone up and come down again.

He wishes now that he had known.
He had a sure thing.

In Popular Science next month: How to build a flying model of the helicopter kite.

Dummy "Killed" In Smashed-Up Car Could Be You



Test car being towed into position for the crash run.



As car smashes into barrier, signals from recording devices are sent through cable at rear.

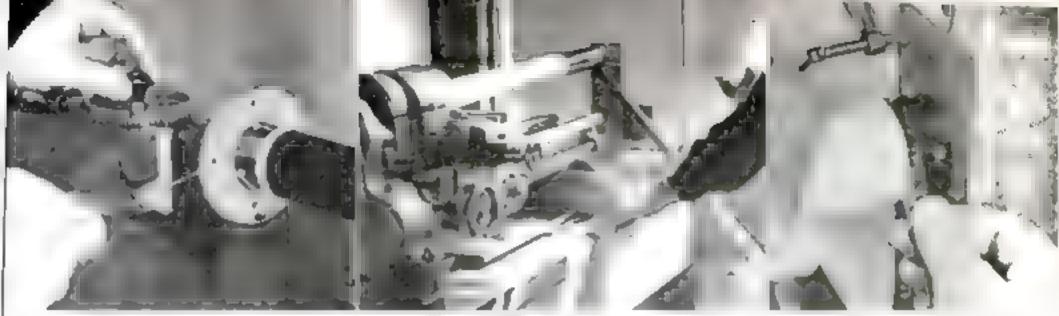


One "dies," one is saved by shoulder harness.

A CAR going 25 miles an hour smashed into a solid barrier of telephone poles the other day. The front-seat passenger was killed. His ribs were broken, his neck fractured, his vertebrae driven together. The driver escaped with cracked knees.

Fortunately, the occupants of this car, deliberately cracked up, were dummies. The driver was protected by a new shoulder harness. The passenger rode like most of us, without a restraining belt. A total of 36 measuring devices and a high-speed movie camera told the story of what happened to the dummies and to the car.

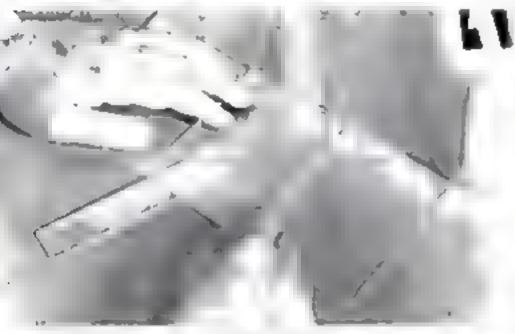
This crash research is being carried on by experts at the University of California at Los Angeles to find out how cars might be made safer and the occupants protected.



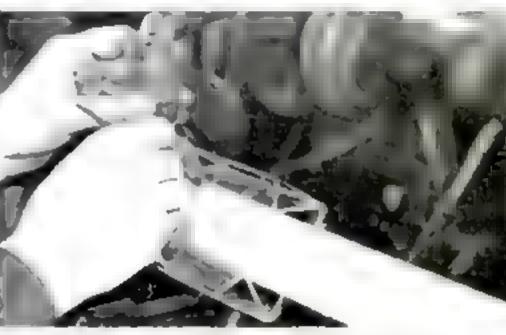
4. TUBE SHOULD TURN freely and run true if centers are well located. An inch from the base, tape the end of the No. 32 wire securely and wind on a few turns, evenly and without overlap. Then mount the spool of wire on a dowel clamped within easy reach. Put a heavy glove on the hand that will feed the wire.

5. If YOU HAVE A LATHE, you can wind with power. Use back gears to get about 150 r.p.m. Keep your hand well back from the tube as shown, angling it about 5° behind the winding point. If the wire overlaps or leaves a gap, go back and reward it evenly. Apply just enough drag to keep the wire taut; avoid jerks that may snap it. The supply reel is best mounted several feet behind you.

6. AFTER WINDING 28" of coil, secure the were with tape. Solder the coil end to a lug secured under one of the wood screws holding top plug. This completes the secondary coil, but do not remove it from winding rig.



8. WITH A THIN-BLADED SAW, cut ribs and plates apart through the centerline of the holes, which will leave notches along 4" of the cut edges. The wide eib will have notches on both edges, so cut off one edge to make it the same width as the others. Hinge plates together with tape.



9. WRAP THE PLATES around the secondary with notches for first primary turn 1" above bottom of the secondary. Tape the corners; then apply plastic cement to edges. Center the rabs on the plates and cement edges, being careful that all notches line up.

forms the secondary cap. Lay it on a flat surface and scribe around it at a diameter of 2". Mark off a ½"-wide connecting tab. Trim off the rolled edge except at the tab. Then cut exactly on the line. File off any slivers in order to leave the edge as smooth as possible.

14. CUT THE NECK of the funnel to ½" in length. Drive in a dowel and hummer the neck over it to a counded top, leaving a ! "hole in the center. Attach the cap with alunuinum cement or body solder, with its tab under the secondary terminal screw. File edges smooth to reduce corona leakage.

15. SEEN FROM BENIND, the tube socket, at back of top deck, has pins I and 4 to the rear. Tests coil is mounted with primary terminals and ground tap toward the rear. Capacitors Cl and C2 are close together, with the feed-through insulator between them and the coil. Plate transformer is inside, filament transformer (in hand) behind it. (Please turn the page.)

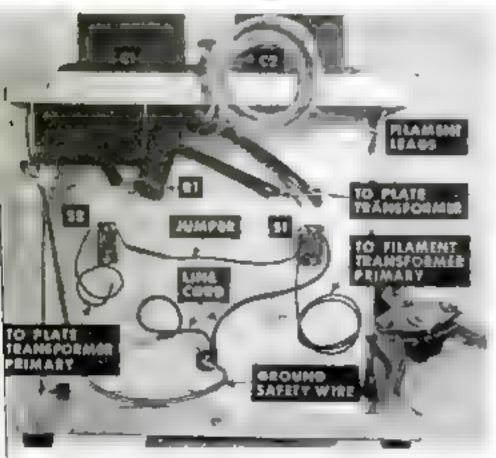




MOUNTING **MOLES** with a longpointed pencil, back up the sheet metal with wood, punch the centers, and drill. Spot holes for filement capacitor C4 so that it can be mounted upside down under rear corner of top deck near tube pins 3 and 4 as in photo below. If you have no chassis punch, make hole for tube socket by drilling a circle of small ones and filing between.



this unoza view of the top deck shows the ground connection for (4 soldered to a lag under one mounting screw. Grid-leak resistor R1 is connected to the other terminal of C4, along with a wire to tube pin 4. The grid capacitor, C3, goes between the other side of R1 (also hooked to pin 3) and the feed-through insulator. Leads from C4 to plate transformer must be high-tension ignition cable. Use No. 12 stranded wire with high-grade insulation from pins 1 and 4 to filament transformer. Pin 2 is not used.



196 POPULAR SCIENCE

The RF transformer. This is the heart of the Tesla coil and somewhat critical. Make no changes or substitutions if you can possibly avoid them. Since the primary coil is built up over the secondary, all operations should be in the sequence shown in the photos.

Firing up. First ground the power-cable clip, both as a safety measure and to minimize the possibility of radio interference, and plug in power cable. Insert the tube and connect its plate cap. Do not connect anything to the secondary coil terminal.

Turn on the filament switch. The tube should light. Holding a fluorescent lamp a few inches from the coil, turn on the plate switch. The lamp should glow. If it does not, turn the power off and check the wiring.

If the lamp glows, turn off the plate switch and stick a short piece of No. 12 wire into the hole in the terminal. When plate current is switched on, a crackling fistful of sparks should sprout from the end of the wire.

Metallic objects may be held directly in the hand and the sparks allowed to jump to the metal. Do not bring the hand itself close enough to the terminal to draw sparks; although there is no shock, they do cause small burns. Partially insulated objects should be held by a long plastic rod so that the potential will not jump through the insulation to your hand.

Trouble shooting. If the wiring is right and the tube is good but only a small spark appears, the secondary coil is probably off specifications. This means the circuits will be out of tune, and not oscillating properly. Rather than trying to doctor the coil, you can tune the circuits by juggling the value of capacitor Cl, which with C2 controls oscillator frequency.

Try a value of 50 mmfd. larger or smaller than the 700 mmfd. specified for C1, and check coil action again. Odd values for C1 may be built up by paralleling several

[Continued on page 234]

POWER WIRING and switches as seen from rear of front panel look like this. The ground safety wire goes to the grounded terminal of C4. One side of the line cord from the AC plug is connected to the filament switch, S1. The other side of the line cord goes to one side of both transformer primaries. Cross connection of the two switches by the jumper as shown in the diagram makes it impossible to turn on the plate transformer until tube filament is on.



LOOK, MA, NO WINGSt Revolving blades alone hoist this frisky model on the breeze. Inspired by Igor Bensen's man-carrying gyro-kite (right), it has two contra-rotating rotors for stability-

Here is the liveliest aircraft-on-a-string you have ever flown. It's a cinch to put it together from balsa, wire and cardboard.

By Roy L. Clough

MUCH more fun to fly than an ordinary kite, this gyro-glider gets up in a moderate breeze and rides steadily aloft, rotors plopping about like a helicopter's.

Instead of a single tilting rotor like Igor Bensen's man-carrying machine (PSM, July '54, p. 98), which requires a pilot on board, this model-has two semirigid coaxial rotors. These turn in opposite directions, keeping gyroscopic and lift forces in bal-

ance. A mast-mounted fin prevents suddenwind shifts from tipping the model over, while a boom-mounted tail takes over the pilot's function of keeping the rotors at the correct angle to the wind.

Build cabin first. Cement X"-square balsa sticks together as shown in the drawing on page 199 to make the cabin, doubling them for the front strut and rear cross member. Reinforce the corners with gussets of X" sheet balsa. The apex through which the rotor shaft passes may be built up of



IT SPINS AS IT FLIES. There's action aplenty with both rotors whirling rapidly when the kite is up. Gusts will drop it a few feet or cause some rolling, but the craft regains flying trim so long as it has enough altitude.



TOO SKINNY TO FLY? There doesn't seem to be enough wing area for the breeze to lift it, but when the rotors start spinning the model is eager to clumb. Landings are best made by hand: kite is unstable close to ground.

three gussets and a cap, or carved from a bit of hard balsa.

The tail boom, also two ""-square members, is cemented on top of the rear crosspiece but behind the middle one. This gives it an upward slope. Cut the tail out of 1/16" sheet as shown, score it down the center, break and recement to give a dihedral of 3" under each tip. Cement it to the boom with a wedge between, as shown.

Wheels may be from a model airplane or a toy, and of course need not turn. Cut out the pilot and his seat from stiff cardboard. Cement the figure slightly off center to let the rotor shaft pass.

Making the rotors. Secure the rotor shaft from turning either by bending the lower end over and lashing it to the boom, or by soldering it to a bit of tin plate clipped around the boom as shown in the photo.

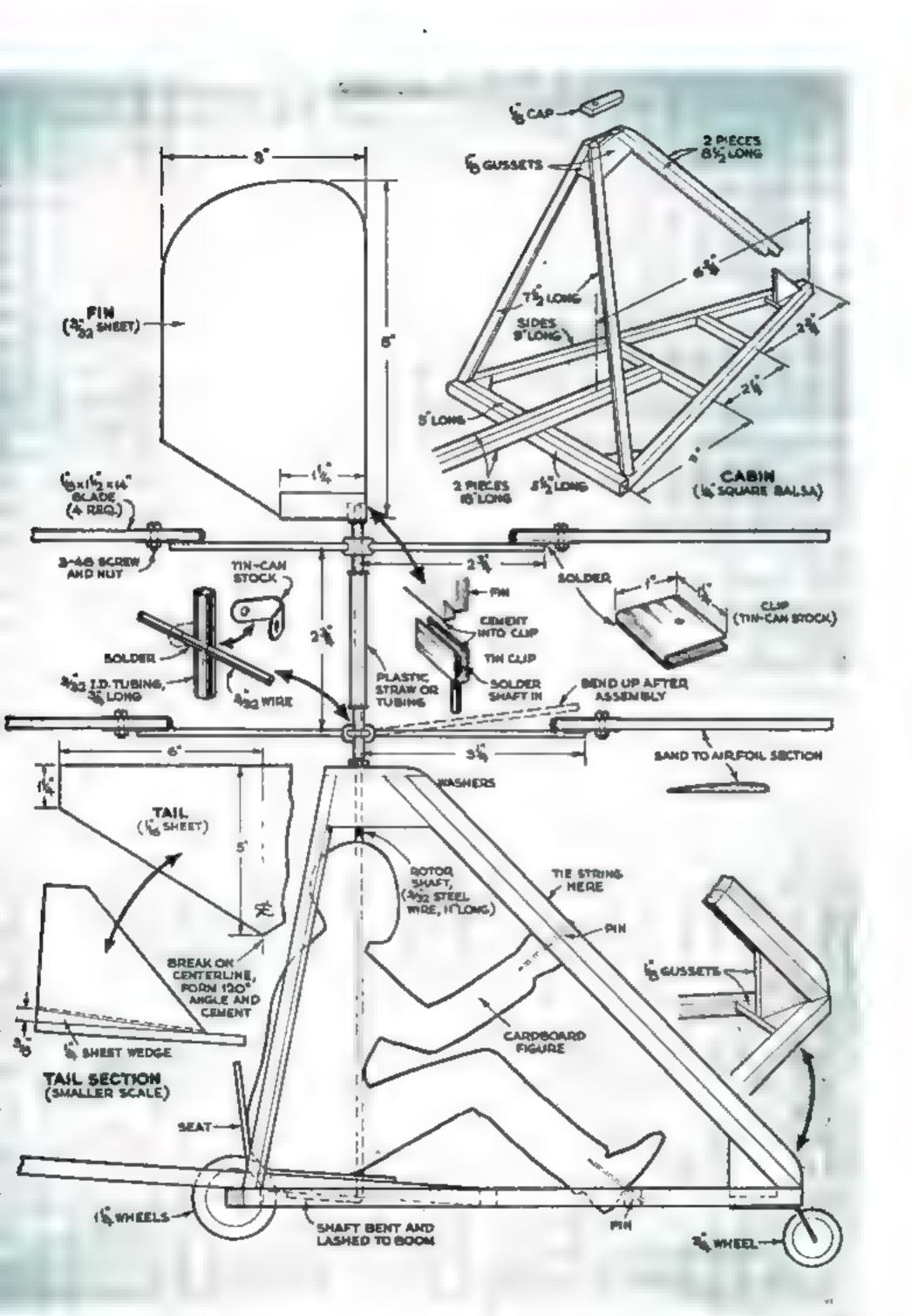
Make the rotor mounts from X" lengths of brass tubing, tin-plate clips, and 3/32" steel wire as in the drawing. Compensate for the off-center mounting by bending the wire slightly. Use acid-core solder for a good bond with the steel, but wash the joints afterward with baking-soda solution. Solder tin-plate clips to the rotor mounts at a right-hand pitch on one rotor and a leftband on the other.

Use small washers and a piece of plastic tubing between the hubs to insure free turning. Solder a washer above the lower



ROTOR SHAFT is stationary, with metal clip for fin soldered to top. Rotors must spin freely. Upper wire mount of rotor is bent to form a dihedral, with about 41/4" between rotor tips, Bottom view of cabin (right, above) shows lower shaft end fixed against

rotation. Tin-can clip with a hole in it is crimped around tail boom. Shaft, pushed through hole, is soldered to clip. Rear wheels are pinned to back frame member; front one is mounted in wire yoke lashed to frame and cemented. Wheels do not turn.



rotor hub to the shaft so that the weight of the top rotor rests on the washer, not on the lower hub. Make four blades of \$" balsa, sanding them to a uniform airfoil section. Bolt them into the clips, and bend up the upper blade mounts to separate the tips of the two rotors by 4%" or 5". This prevents blade clash and minimizes interference due to rotor wash.

Do not try to simplify the rotors by using a solid wooden hub. The spring wire mounts take the place of drag dampers in the real thing; without them, the blades would shatter in anything more than a mild breeze.

The fin clip at the top of the shaft retains the rotors. Be sure it is aligned with the tail boom; then cement the fin into place and squeeze the clip around it.

How to fly it. Tie strong kite string to the front cabin strut just above the pilot's

arm. In a moderate breeze, hold the model at about 45° to the wind and let the rotors come up to speed. When both are spinning as fast as they will go, release the model and quickly pay out a few feet of line to let it reach its own equilibrium. If everything is right it should continue to rise, with the rotors spinning freely, until it reaches its ceiling. This is determined by the weight of the string, the wind velocity and where you tie the bridle.

Should the model tend to roll over, first check the alignment of the tail and fin. If this is correct, one rotor is probably turning faster than the other.

Twist a bit more pitch into the slow rotor by bending the blade clips gently. For top lifting efficiency, however, keep the pitch of both rotors as small as is consistent with fairly high turning speed. END

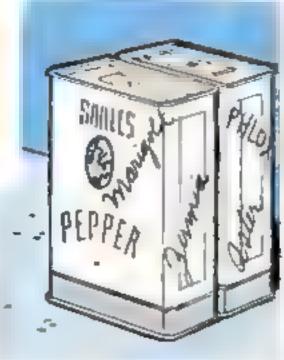
Twirlichutes Are Fun to Sail, Take Only 30 Seconds to Make

What's a twirlichute? It's a spinning paraclitte, made of paper, that twirls merrily as it glides to a soft landing or soars doft on a breeze. Maple seeds do the same thing every spring, but with these paper toys you, plus all the kids who'll gather fround you, can have fun at any season, Use ordinary pad or typewriter paper, not eard or stiff stock. Slit and fold a strip three or four times as long as it is wide. Crease the wing roots lightly, letting the wings droop in opposite directions, They work hest if floppy, not stiff. Weight the bottom with a small paper chp or two staples.-O. P. Ortherry, NYC. 2 × 8 STRIP CREASE FOLD STAPLES OVER

A knockdown table of plywood is handy for roadsult picnics or camp meals. Cut the top to fit the car trunk and screw floor flanges to the underside to take legs of iron pipe. Store it near your kitchen and it will do temporary duty when more counter space is needed



For easier sowing next spring, gather this year's flower seeds in empty spice cans. The fine seeds can be sifted to the soil through the small holes; the big fellows will pour from the large slot under the sliding top. To store an ice pick away from small hands but within easy reach of your own, slip it through a couple of screw eyes set conveniently in the wall alongside your refrigerator or freezer.



KEEPING THE

Home. SHIPSHAPE



If the catch rattles when an interior door is closed, a small pad of sponge rubber cemented to one leaf of each hinge will quiet it. A spongerubber powder puff will supply more than enough of the material needed for the job.



Freezing your harvest? An old-fashioned electric curling from can speed the work. Faster than a pressing from it scals the plastic bags while they stand upright. Use only moderate heat.



Pop go the wieners, three or four at a time, if you roast them by shaking them over the fire in a corn popper. Caged in ware, not a frank is ever lost in the flames

A portable clothes dryer for motel-hopping travelers can be made by binding together two wire hangers and a cake-cooling rack. Lash the parts with cord or wire, keeping it loose enough to allow the dryer to fold flat when it is not in use.

A too-short pump will reach the last of the insecticide in a spray bottle if you lengthen it by adding a piece of drinking straw or by wrapping it with tape.



Agitate the wash with an old vacuum cleaner if your summer cabin has no washing machine, Switch the hose to blower end, insert curved metal nozzle and metal tubing, and lower into tub.



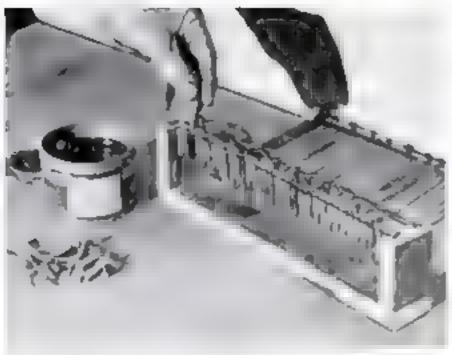
at ends. Flap bent back and

ect in at sides forms hanch

trough Brace at with plywood

and screw top of can to wall

-202 POPULAR SCIENCE



Screws Wax-Dipped in Quantity

To COAT screws for driving into hard-wood, dissolve some paraffin, dip the thread into it, and hang them between wires on a wood frame like this to dry. Melted wax or soap paste can also be used.—Clinton R. Hull, Costa Mesa, Calif

Keeping an Eye on the Pupils

A REAR-VIEW mirror mounted over the blackboard enables one teacher to keep an eye on the pupils with her back turned.



One-Boy Seesaw Hooks to House

A SHORT plank hinged to the side of the house and held by a strong spring will give a child a lot of fun on days when there's no one around to play with. Use a two-by-eight about 5' long and pad the seat end with cloth or burlap. Make sure the screw eye is firmly attached to the house.—V. H. Lamoy, Upper Jay, N. Y.



ECONOMICAL conversion instead of costly rebuilding has improved the utility of our wooden-body station wagon. For an outlay of \$55.60 we now have a vehicle with pick-up-truck capacity and passenger-car riding qualities.

The photos show what we started with -and what we now have.

All decayed wood was stripped away from the rear of the body and the rotted

part of the top sliced off. Side sweeps shaped from %" exterior plywood were then installed in the rear body panels. Stanchions at the rear corners were cut off at tailboard height. Other changes included a bulkhead behind the middle seat and a plate across the end of the cut-off top. Removal of the rear seat from the vehicle gives us easily accessible rear cargo space.—Bill Knodt Jr., Essexville, Mich.



With a steady boost from your auto battery, the dry cells in your flashlight will give you a good light and last a long time.

A GOOD flashlight can be a lifesaver on the road-but one that has been cooking in a hot glove compartment for months may let you down.

This home-rigged flashlight has two slick tricks up its sleeve. In the car, it travels on a mount hooked to the electrical system. This keeps the dry cells up to strength much longer than usual. A powerful magnet bolted to the flashlight case both holds it in the mount and lets you stick it to any steel part of the car, leaving hands free.

The reviving gimmick. It's a fact that dry cells can generally be kept at full strength longer by feeding them a little direct current between periods of use. This is not like the recharging of a storage battery, and it will not restore dead cells. But it will stretch cell life considerably.

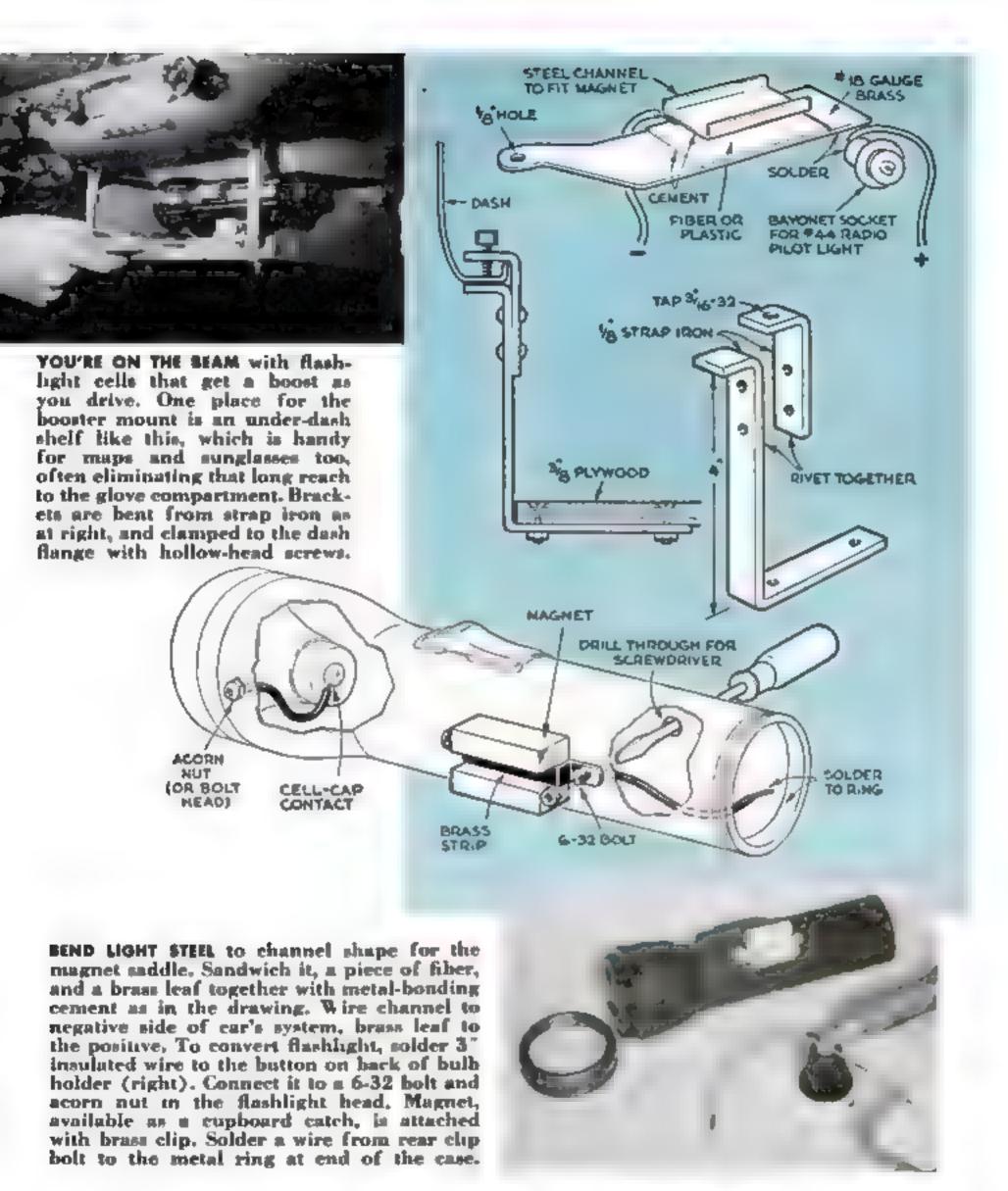
Begin with a plastic or rubber-cased

flashlight using two standard D cells. (You need an insulated case because a metal one would short out the magnet and bolt that serve as the booster contacts.)

Building the mount. I keep my light on an open shelf under the dash. The magnet snaps onto a small steel channel, and a brass leaf insulated from it touches the bolt on the case. A No. 44 radio pilot bulb in the circuit limits boosting current to about 100 milliamperes, and also indicates the condition of the cells. Do not use any other bulb.

Connect the brass leaf to the positive and the magnet saddle to the negative side of the car's electrical system. If you don't know which is grounded in your car, see whether the battery posts are marked and which has the ground strap on it. If this doesn't show, assemble the rig and put the flashlight in place, its switch off. Then ground one wire and just flick the other on a live terminal.

If the pilot bulb flares brightly, reverse the booster leads. With good cells, it should just glow yellow-orange when correctly

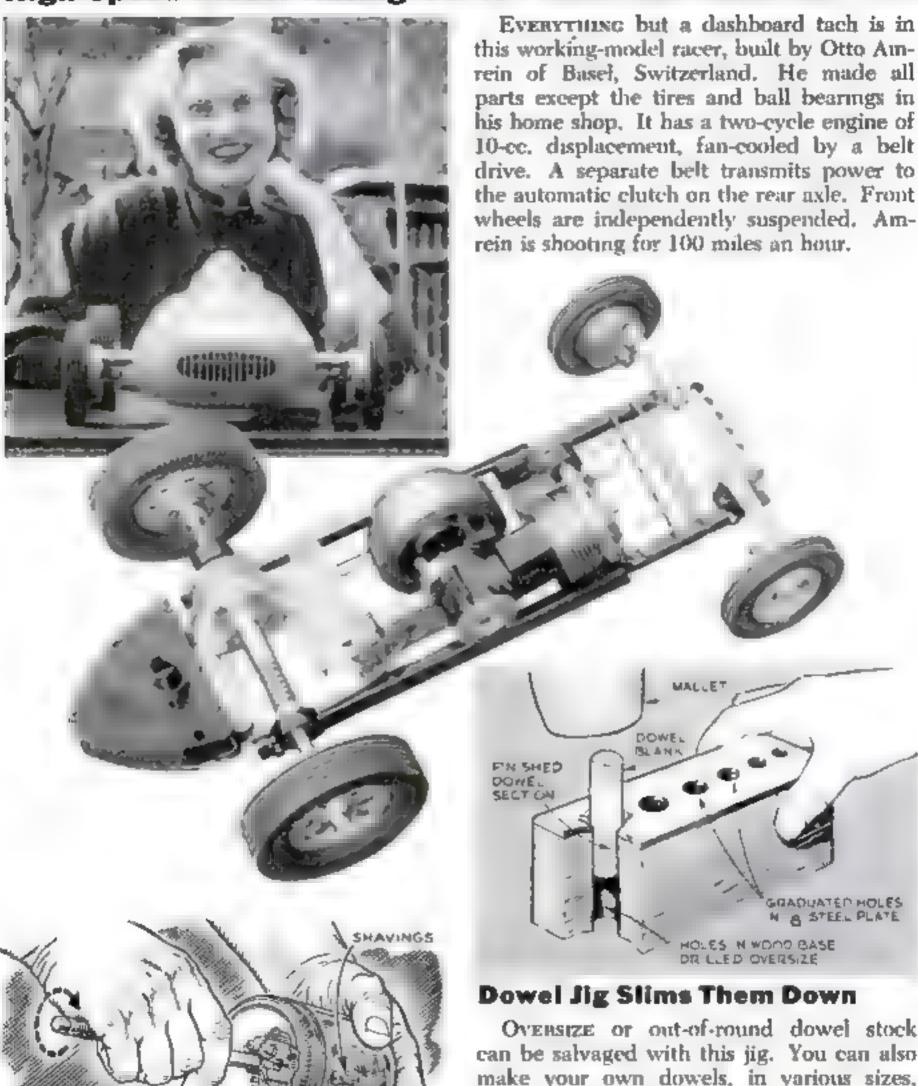


hooked up. For permanent connection, take the hot lead from something constantly energized, like the cigarette lighter. Don't tap the switched side of the ignition, for with the key off, the dry cells will drain back through the dash gauges. An on-off switch is optional; you can simply put the light on its mount backwards to take it off the booster line.

Checking cell condition. Run-down

cells have lower internal resistance than fresh ones, and will let the pilot burn yellow-white. As they come up to strength, the pilot should dim. But with worthless cells, it will glow brightly even after long boosting. To protect the flashlight bulb, don't turn it on when the case is in its mount. Avoid letting the magnet and contact bolt touch metal simultaneously, as this shorts the cells.—Hugh Smiley Jr., Henniker, N. H.

High-Speed Model Racing Car Is Fitted with Clutch and Fan



Jar Catches Pencil Shavings

HAND PENCIL

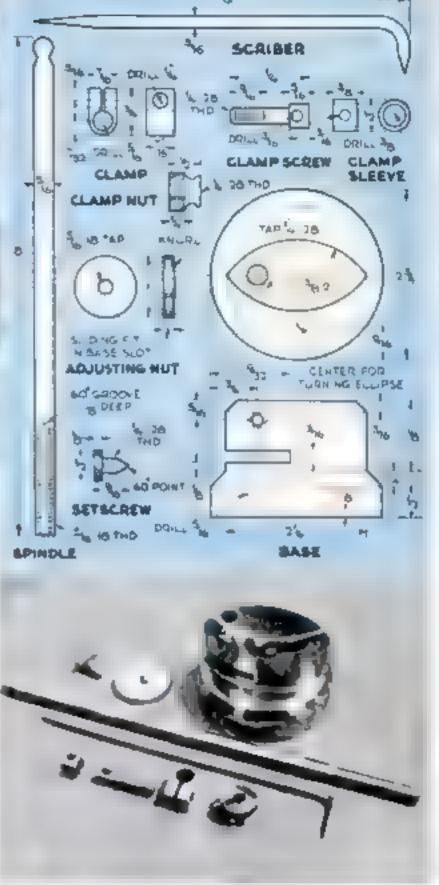
MOUNTED on the inside of a metal jar top. a hand pencil sharpener is easier to use, and the jar catches the shavings. Run two self-tapping screws through the lid into holes drilled in the end of the sharpener, Drill a %" hole to admit the pencil.-Rufus P. Turner, Los Angeles

Oversize or out-of-round dowel stock can be salvaged with this jig. You can also make your own dowels, in various sizes, from wood of irregular section.

The jug consists of a steel plate, with holes of graduated size, screwed to a wood block. Oversize holes in the block provide clearance for the dowels being formed, Stock is forced through the jig with an arbor press or a mallet.

When the edges of the steel-plate holes become dulled, new cutting edges may be established by re-drilling each one with a drill one size larger than the original.— J. E. Cushman, Stonington, Conn.

shop Ideas



Surface Gauge Is Lathe Project, Any modelmaker or machinist needs a surface gauge to sembe layout marks on many work pieces. Making one ordinarily calls for a shaper or miller, but this gauge can be made

entirely in your lathe

Turn the base from a chunk of 24" coldrolled steel rod. Face the bottom and cut a bevel X" up from the bottom surface to form the round part of the base. Then chuck the base 13/16" off center in a four-jaw chuck and turn one-half of the elliptical upper part, Loosen two jaws slightly and rotate the base 180° in the chuck to turn the other half of the ellipse. Drill holes for the spindle and setserew and cut a 3 16" slot for the adjusting nut. Use a milling attachment to cut this slot parallel with the bottom, or else cut it with a hacksaw and file it smooth.

Turn the clamp screw, sleeve, spindle and knurled nuts from short pieces of coldrolled rod, After threading the spindle, cut a V groove in it by forcing a threading bit laterally along its side while it is in the lathe. Clamp the bit on its side in the tool holder and make several passes until the

groove is %" deep.

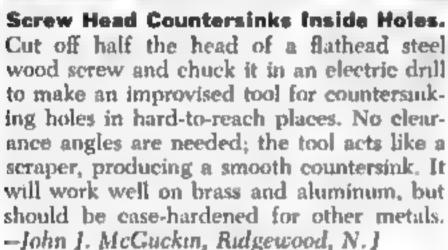
Make a 3. 16"-diameter hook scriber from a 6" length of drill rod. File the scriber clamp from a small block of mild steel, leaving only a thin wall around the spindle hole so it will spring easily when the clamp

nut is tightened to lock it on the spindle.

Slip the adjusting nut in the slotted base and twist the spindle down into it. Screw the pointed setscrew into the tapped hole in the base and turn the spindle so that the point of the screw enters the V groove, preventing the spindle from turning.

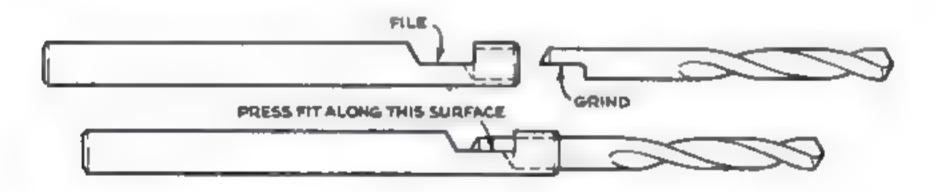
In use, set the gauge to the approximate height by sliding the scriber up or down the spindle on its clamp. Then make the fine adjustment by rotating the adjusting nut to move the spindle up or down, bringing the scriber into the precise setting desired.—Will Thomas, Buffalo, N. Y.





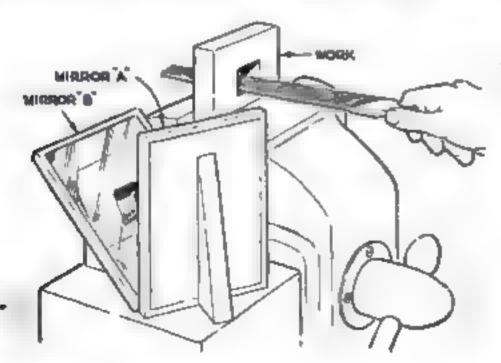


Make Your Own Layout Blue. Get a sheet of hectograph paper at a stationer's and cut a quarter of it into small pieces. Soak the pieces in 2 oz. of alcohol to dissolve the amline coating and drain it into a clean screw-cap bottle. Add a tablespoon of shellae to give it body. This solution will dry instantly on metal surfaces, leaving a deep purple film that won't flake off when scribed.—J. M. Finn, Pittstown, N. J.

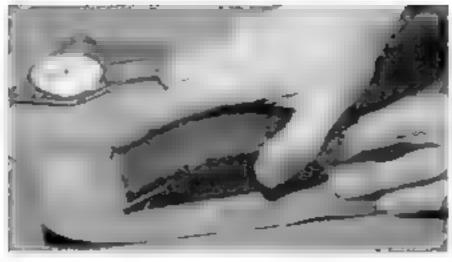


Drill Extensions Are Removable. Crind an offset on the shank end of a drill and fit it into a matching hole drilled in a length of steel rod of slightly larger diameter. File away half the rod just above the hole

to engage the offset on the drill shank. This way, your drills can reach into hard-to-get-at places and still be available for regular drilling operations.—Fred Barker, Hion, N. Y.



Mirrors Ease Filing Operations. Instead of stooping frequently to check your progress when filing to a line, arrange a pair of mirrors beside the vise to reflect the image of the workpiece up to you. Mount the mirrors on a block of wood so that mirror A reflects the image to mirror B, which then reflects it upward. The image is reversed by the first mirror and re-reversed by the second one, presenting the true image to your eye.—Federico Strasser, Santiago, Chile.



Sanding Thins Down a Washer

If you must reduce the thickness of a washer, spacing ring or similar part by a small amount, place it on a sheet of abrasive and rub with a sanding block. This stunt is also useful for putting a fine finish on flat metal parts used in craftwork.—Walter E. Burton, Akron, Ohio.



Tire Rims Support Oil Drum

Two demountable tire rims obtained from an auto junk yard gave me the makings for a useful oil-drum stand.

The rims were cut into two equal arcs. Then the arcs were turned back to back and welded together. The two rim assemblies were fastened by an iron rod welded between them.—Harry Sloan, Oswego, Kan.

Alarm Ring Identifies Circuits

Unmarked fuse boxes can be a nuisance when you want to cut out one of a number of house circuits for repairs. You can save running up- and downstairs by plugging an electric alarm clock into the circuit to be worked on, and letting it ring while you back out the fuses, one at a time. You've got the right fuse when the alarm shuts off.—Roger Sessler, Jamaica, N. Y.



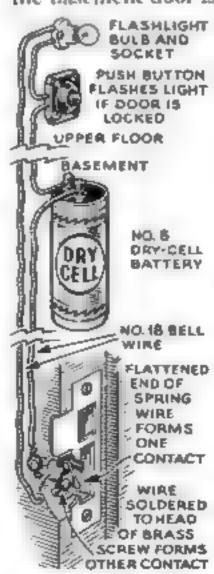
Clock Face Helps Draw Star

THE face of an old clock is a handy aid for drawing a star or dividing a circle into any number of equal parts up to 60.

To lay out the points of a star, place the clock face on the center dot on paper and make a mark every 12 minutes. Draw lines from the center point through these marks and connect them to form the points.—Ken Olin, Marquette, Mich.

Is the Basement Door Locked?

When you are closing up the house for the night, do you always wonder whether the basement door is locked? To save myself



a lot of steps, I rigged up the push-button checking apparatus illustrated in the sketch. Now all I have to do is push the button at the top of the basement stars. If the door is locked, the light glows. If there is no light, I know I must go down. A No. 6 dry-cell battery supplies power for the circuit.

If there is a steam or water pipe handy, you won't have to string a second wire to the first floor. Let the pipe do the job.— W. C. Irving, Silver Spring, Md.

Jeep-Mounted Ladder Gets the Apples



EXCINEENING IS Hugh A. Mills' business and he applied its time-saving principles to the job of picking apples on his farm. Putting the ladder on a jeep gets the job done twice as fast

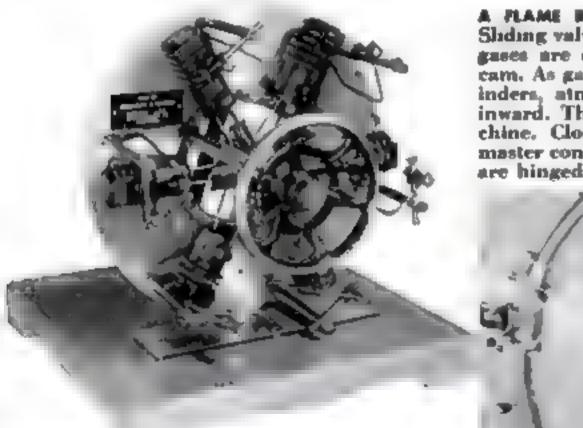
The ladder feet have prongs that fit in holes in the bumper and are secured by cotter pins. The prongs are just %" hag screws with their heads sawed off and their ends drilled for the pins. Guy wires to the body hold the ladder up.—

Benjaman West, New Canaan, Conn.

PSM Reader Builds Six-Cylinder Version of Radial Vacuum Engine

Taking his skills as a machinist home with him to use in his hobby, Waldemar G. Hansen of Los Angeles built five copies of PSM's Mystery Engine (Feb., '50, p. 206). Two cylinders, he thought, would be better

than one. So he made a couple of two-cylinder engines of the same kind. His most ambitious project yet is this six-cylinder radial job. It is fired by six gas jets and is said to be instant-starting.



A PLAME BURNS before each cylinder port. Sliding valves, which close the ports after hot gases are drawn in, are driven by a single cam. As gases cool and shrink inside the cylinders, atmospheric pressure drives pustons inward. The flywheel is from a sewing machine. Close-up below shows the six-lobed master connecting rod to which the other five are hinged. Circular pipe carries gas.

Trash-Can Stand Keeps Yard Neat

This good-looking stand spruces up the back yard, keeps neighbor-hood pooches from knocking the trash can over, and has a quick-release catch to keep hurried garbage collectors happy.

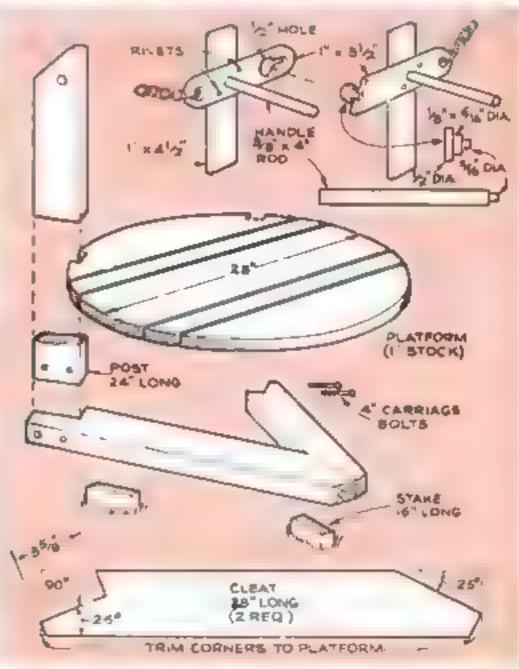
The stakes, cleats and uprights are all two-by-four stock. Cut the two cleats to shape, and drill holes at each notched end for %" bolts

Drive the three stakes into the ground under the V formed by the cleats, mark the stakes with a level and cut them off square. Fit a 3' disk of tar paper over the stakes, then nail the cleats on

Bolt on uprights. Nail random widths of I" stock temporarily together, a wide piece outside. Cut the round platform to shape, notch wide piece for uprights, and remail pieces to staked cleats.—Vern Forsberg, Scattle, Wash







Easy-to-Make Fiber Jaws Keep Pliers from Marring Metal Parts

ONE day while working with some small brass pieces it occurred to me that I could use a tool I had never seen—a pair of phers with fiber jaws. Two bits of red fiber 1/16" thick cemented to variable-axis

pliers gave me exactly the tool I wanted.

Use one of those stick-to-anything cements for the job. To allow for the fiber thickness, open the phers in the second axis.—
R. L. Clough Jr., Bristol, N. H



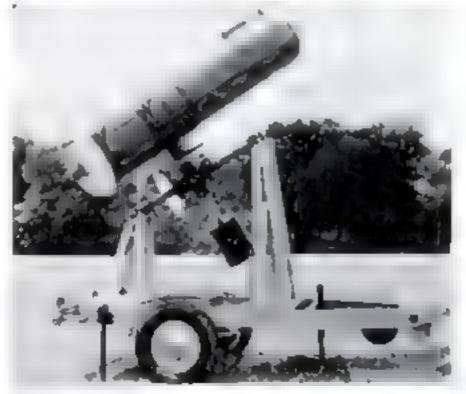
Radio in the Cupboard. Radios have found their way into just about everything but the kitchen sink—and below is one that almost made even that. Using parts of three sets, Daniel P. Pomponio of Berlin, N.J., installed the radio in the drawer of his wife's corner kitchen cabinet. An outward-sloping panel allows the tuning push buttons to be adjusted from a standing position. Chrome bars cover the speaker.



CRAFTSMEN

Twin-Hull Boat. One of the strangest, but most comfortable, craft navigating the Portage Lakes near Akron, Ohio, this summer is a motorboat whose twin hulls were once an Air Force bomber's fuel tanks. The boat was built by George Charles of Tallmadge, Ohio,

A 6-hp, outboard mounted between the stern ends of the fuel tanks drives the craft at about 15 m.p.h. A tiller that can be manipulated from the deck provides steering. Hatches give access to the two hull tanks for storage.



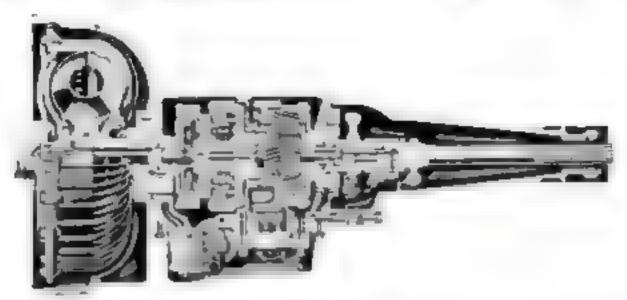
Observatory on Wheels. This 20" Casse-grainian reflector telescope, built by Frank W. Manning of New Orleans, rides to a viewing site on an all-welded trailer. It is then unbitched and leveled by means of three car jacks. An electric drive turns the large gear on the polar axis, synchronizing the telescope swing with star movement.

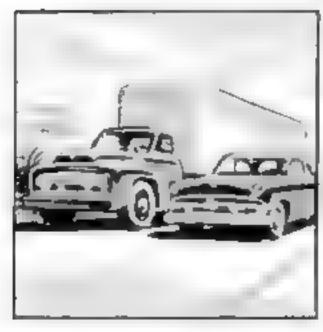
The 20"-diameter main mirror is a Pyrex disk, 4" thick. Its focal length is 100". Six iron disks, totaling 500 lb., balance the instrument on the declination axis. The finder, mounted near the eyepiece, is a 3" refractor telescope.



Of all automatic drives in the low-price field:

Fordomatic is





Simply press down on the accelerator at any speed up to 58 mph and you get nearly 50% extra passing power with Fordomatic's automatic intermediate gear. Only Ford in its field has it.



Gives you smoother braking down hill. When selector is moved to low at speeds above 25 mph. Fordomatic goes into intermediate gear until speed falls below 25, then goes into low . . . for smoother, extra-sure braking.



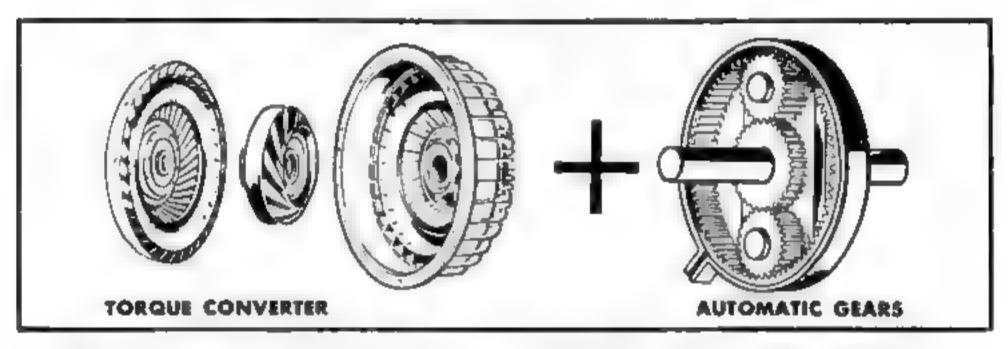
of safety. Fordomatic lets you go from neutral to reverse without having to pass through a forward drive position. Selector must always be in neutral (N) before starter will operate.

Worth more when you buy it . . . Worth more when you sell it!



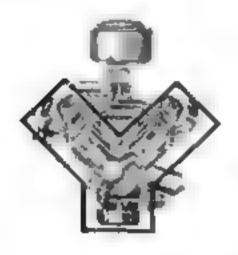
the most versatile

Fordomatic combines a simple 3-element torque converter with a 3-speed planetary gear system to provide the widest range of fully automatic operation!



Fluid torque converter smooths the way. With Fordomatic's torque converter, power is always transmitted to the rear wheels through a "cushion of oil," There is no direct mechanical connects in between engine and rear wheels. So you get smooth operation with a minimum of wear.

Mechanical goors widen operating range. Starts in DR range are through automatic intermediate gear which combines with converter to multiply torque as much as 3.11 times for fast, smooth starts. For unusual conditions, selector may be set at Lo to multiply torque up to 5.13 times?



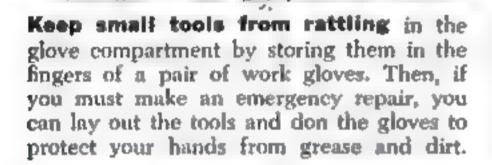
Choose the only V-8 in the low-price field! Team Fordomatic with the industry's most modern engine—the new 130-h p. Ford Y-block V-8—and you have the smoothest, most versatile automatic "power package" in the low-price field, Deer-block low-friction design smells smoother.

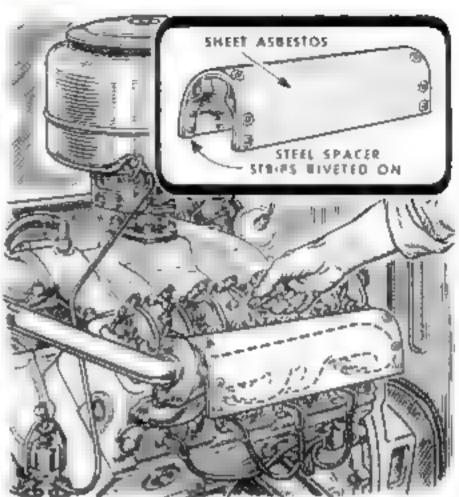
Deep-block, low-friction design spells smoother going, more "Go" per gallon and longer life.

Your Ford Dealer cordially invites you to Test Drive the

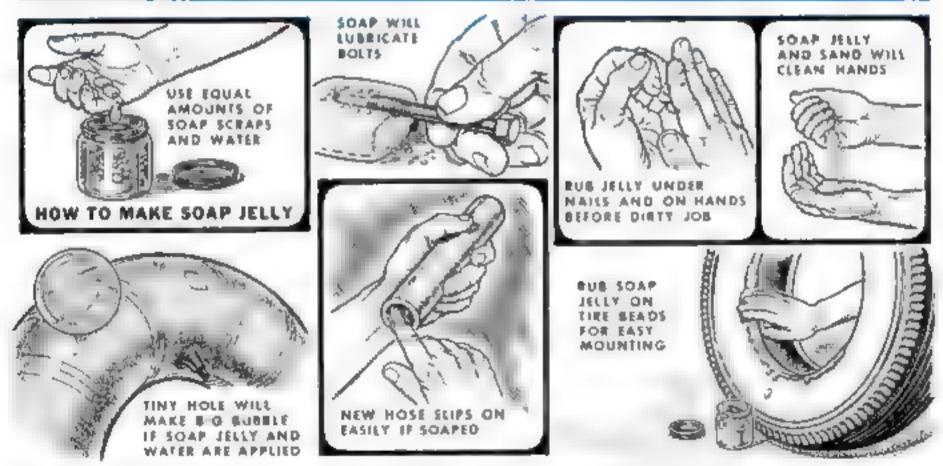
FORDOMATIC Ford

FROM THE MODEL GARAGE





Make an asbestos shield to keep your hands from being burned by a hot manifold when tuning or adjusting an engine, Cut sheet asbestos to fit over the exhaust manifold and rivet steel strips to the ends to clip the shield in place.



Soap for everything. Keep a bar of soap in your car's tool kit-it has many uses: Lubricate a bolt with it when grease or oil would cause a stain; rub it on an inner tube to help locate a leak; slide a hose on a fitting without effort by rubbing soap on the in-

side; or lubricate a tire bead with it to make tire-changing easy. Rub soap over your hands, too, and in your nails before starting a job-washing will be easier later. Soap jelly, made by dissolving small scraps in a jar of water, is especially easy to apply.

Please turn to page 218 for more auto kints. 216 POPULAR SCIENCE

GET IT-AS AN AIRMAN

• This Airman is using "know-how" to guide this plane to a safe landing. He got it in the Air Force and it will serve him anywhere!

• "Air Force know-how" is the result of top job training at the finest technical schools. Here you can learn anything from Control Tower Operations to Jet Mechanics from Personnel Management to Printing and Communications. There are over 400 valuable courses available.

- And the job you learn is one you can be happy with because it's selected scientifically for you by guidance experts who carefully consider your interests, capabilities and the needs of the Air Force,
- Make "Air Force know-how" your way to success. Insure two futures your country's and your own as an Airman!



STUDENTS! If you are still in school, graduate before you enlist!

U.S. V AIR FORCE

PERSONNEL I AFPTR-P-4 U.S. AIR FO Waxbington	
	an Airman in the U.S. Air Force,
Nome	
Address	
City:	ZoneState

MORE Hints from the Model Garage



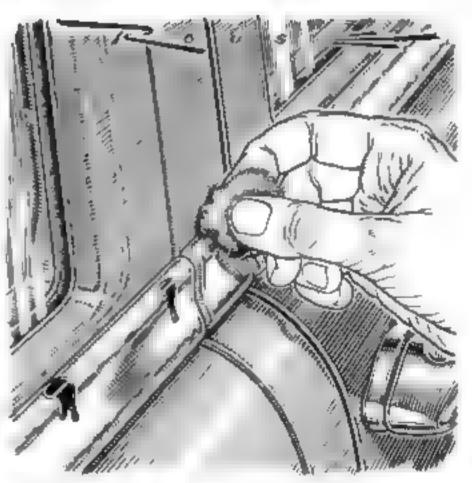
Improvise a coat-hanger bracket by closing a rear window tightly on a rubber fruitjar ring. The ring will support several garments on hangers and will leave no marks or scratches on the window. A ring cut from an inner tube will serve as well,



Calibrate an old coffee pot for use as an oil measure by filling it a pint at a time and punch-marking the side to the level reached as each additional pint is poured into it. Make the punch marks crisp enough to be clearly visible from the inside.



Make fender skirts easy to remove by coating the lock bolts with heavy wheel-bearing grease to keep them from rusting. Skirts are bolted on many late-model cars and it is almost impossible to remove a rusted-tight nut without twisting or otherwise damaging the fender.



Clean paint off chrome trim or rubber moldings with steel wool, after doing a touch-up or spray job on the body. Wind the wool around a stick if the area is small or hard to reach. This way, you won't put scratches on the trim as you might with a knife or scraper.



Three types of Upson Fanck are used to finish this striking recreation room. See below for details.

Ideas for weekend remodeling

with UPSON DO-IT-YOURSELF PANELS

Upson makes a complete line of Panels for remodeling your home. In the recreation room pictured above for instance... the ceiling is covered with Upson Ceiling Tiles, washable, durable, attractive. The wall behind the bar is stunning Upson Striated Paneling, easy to apply, easy to paint. The far wall is Upson Strong-Bilt Paneling,

permanent, crackproof, adds lasting beauty. The bar . . . sawed squares of Strong-Bilt with beveled edges.

See your lumber dealer and look over every Upson Panel type. Insist on the name "Upson" for top quality material.

For full details, mail coupon today!

Idea. Cover inside of closes doors with Upson Feg-it Panes. Makes handy storage space.

Upson All Weather Sheathing, heavy duty, waterproofed, perfect for siding a garage.



upson DO-IT-YOURSELF panels

PROVEN QUALITY YOU CAN TRUST

THE UPSON COMPANY, 488 UPSON POINT, LOCKPORT, NEW YORK	UPSON
Please send FREE details on (name of product) Please send FREE folder on all Upsan Panels.	
Street	
CityState_	

1. Fish scaler takes the mess out of a mess of fish by preventing the scales from flying in all directions. It catches them in a cuplike cover, then rinses clean in hot water. The scraping teeth are cadmium-plated to



make them rustproof and the scale-trapping cup shields the blade for safety when the Scale-Catcher is in use or carried about in the fisherman's pack. The scaler is sturdily made and odor-resistant.

2. Fishing-rod case of toughened plastic will withstand the shock of a 200-pound man jumping on it; won't warp, dent or cor-



rode. Two inches in diameter, the case will hold two fly rods or two or more casting-rod tips and most spinning rods. The longest size—55 inches — weighs only 16 ounces.

3. Casting buoy, threaded on fishing line, locks into position a few seconds after



alighting on the water. An adjustable control valve lets you set the timing on the locking device and the automatic action allows bait to be raised or lowered at will as you fish. Upon retrieve, the casting buoy is automatically unlocked.

4. All-in-one reel eliminates the rod and gives you one piece of gear for spin-casting,



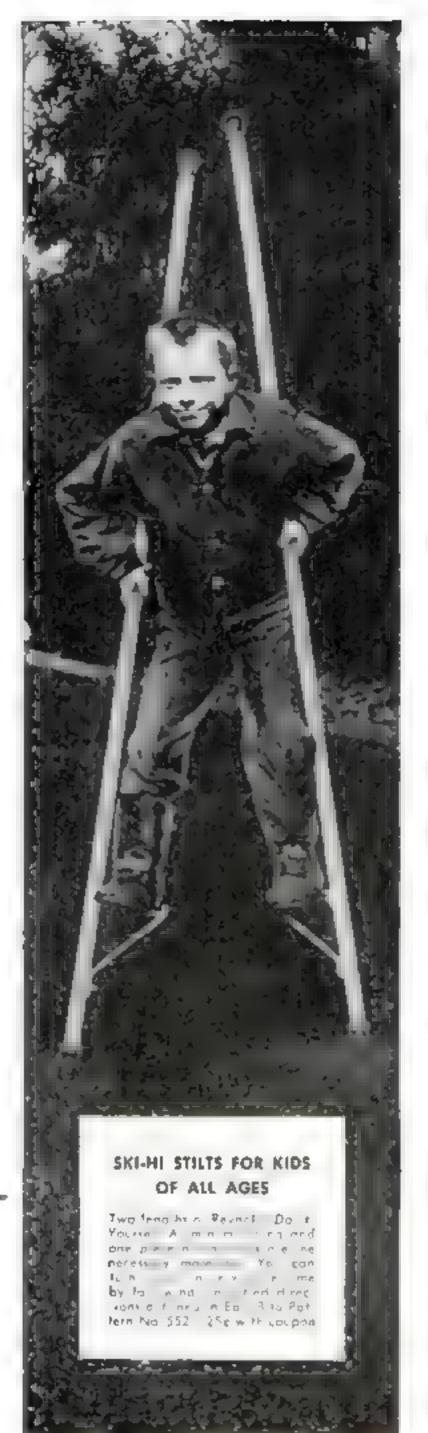
trolling, drop-line fishing and crabbing. A sensitive brake on the rodless reel gives control of fish and line and its fast retrieve—1% feet per turn—should land more fish. The reel is lightweight and easy to use.

Rod and Tackle Fans Get New Crop of Aids for Reeling in Big Ones



5. Washable creel loses fish odor when dunked in suds. Big enough to take a 16-inch fish without bending, it has plenty of air holes to keep a catch fresh and cool.

Further information on these products can be obtained from, 1, Mercary Plantics Co., 20727 Mound Road. Van Dyke, Mich.; 2. Damont Corp., 23 Bay St., San Rafael, Calif.; 3 Coughlin Specialties Co., 579 Drexel Ace., Detroit 15; 4, Reel Easy Corp., P.O. Box 1093, North Station, Arlington 7, Va., 5. Hawkeye Tackle Products, Inc., Dexter, Mich.

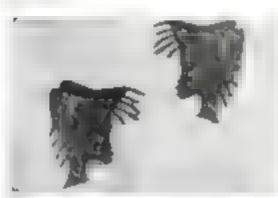


HOW TO GIVE YOUR HOME PROJECTS THIS PROFESSIONAL LOOK!

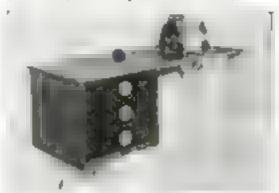
...make them yourself with Reynolds Do-It-Yourself® Aluminum using standard hand or power tools

You can turn out project after project easily and quickly with this astonishing new material - Reynolds Do-It-Yourself Aluminum. You can saw it, plane it, drill it, shape it, joint it and bend it with tools found in the everage home. In fact, all leading hand and power tool manufacturers approve Reynolds Do-It-Yourself Alu-

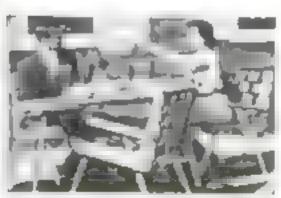
Designed in easiest-to-use forms, Reynolds Do-It-Yourself Aluminum comes in sheets, tubing, rods, bars, angles, storm sash, acreen sections and handy fasteners. Coution! Use only Reynolds Do-It-Yourself Aluminum. Identify before you buythere's a special Seal on every piece to tell you it's Reynolds Do-It-Yourself Aluminum.



African Primitives add Decorator's Touch, Reynolds Do It Yourseilem bonned Alumenum simplifies moting Con be cut with scisions. Easi 8 ldt Patiers No. 539, -25g with coupon



Make this Decorator's Library Dask. No special skill or experience is needed to by ld this smartly sty ad desk Anyone con build it by to lowing Eas -8.1d Pultura No. 537. -50¢ with coupon



Porch, Game Room, Terrace Table and Modern Web Chairs. Top is made from heavy stock lumber, held together with aluminum tubing. East Bild Politern No. 554-50g with coupon. Web Chairs, East 8 ad Pattern No. 548 -50c with coupon

Look for this handy self-service display rock at your Hardware or Department Store of Building Supply Dealer's withbut delay. And give your home projects the professional look with Reynolds Do-If Yourself Aluminum.

T M PETRO, OF METALS COMPART



REYNOLDS ALUMINUM SERVICE CORPORATION

2494 South Third Street, Louisville 1, Kentucky

Please send me the following PATTERNS and Itee bookings (check as desired). I enclose \$...... in money order or core. [No stomps, please.]

	East Bild Pottern #537 for	
П	Decorator's Library Desk	50¢
	East-Bild Pattern #539 for	
	that the same of t	6.4

Ecu-Bild Futtera #548 for Wab Choirt Ean Bild Pattern #552 for Ske-Mr Stills25¢

African Primitivas - 25€ Eas -B. ld Pattern #554 for Terroce Tobie 50€

Mow To Booklet containing gene of instructions FREE

Address_

Reynolds Do-Jt-Yourself Aluminum is also available in Canada

Poor Man's Space Station

[Continued from page 73]

solar-power supply for charging storage batteries.

As it sped over the poles at its dizzy speed, our new moon would look something like an apple on a stick, with the stick pushed through to poke out at either end. These protruding sticks would be made of cast-aluminum tubes and serve as antennas; they also would contain various instruments such as gamma-ray, cosmic-ray and aurora counters.

A window, made of special filter glass, in the MOUSE's skin would let through maly solar ultraviolet rays, another of beryllium would admit only solar X rays.

Data Would Be Recorded on Drum

How would the satellite send back to earth all the information gathered by these counters and instruments? Continnous radio communication would soon drain the solar electric supply. So, to save power, the MOUSE would store up its information and record it on a magnetically coated drum. This hoarded information would be transmitted only twice during each orbit, at the most advantageous points, the poles. There communications planes or ground observers would radar-trigger the MOUSE's transmitter so that it would send out in 30 seconds all the data it had collected in the previous 45 minutes.

This would be done by recording with the drum moving at 1/30 of an inch per second, using 7% feet in 45 minutes. The playback, at a speeded-up three inches a second, would take only 30 seconds.

Vapor Trail Visible from Earth

Would you be able to see the MOUSE as it sped 200 miles over your head? Not normally. But it could be arranged. Either the MOUSE itself, or the burned-out third rocket that came tumbling after, could exhaust a sodium-vapor trail. This, when hit by bright sunlight at high altitude, would light up with a spectacular brilliance.

After several weeks of its pole-over-

pole globe circling, even the slight friction of the upper atmosphere would slow the MOUSE, letting it go down to make some investigations at lower altitudes before finally plunging earthward to consume itself like a meteor.

Dr. Singer does not recommend a space station as a military bombing platform, pointing out that one cannot just release a bomb from a space station since the bomb itself would become a satellite and not drop to earth. He feels, however, that his MOUSE would have some military value, such as gathering information for long-range weather forecasting and learning more about the vagaries of long-distance radio communication. And he adds another point. Using the upper atmosphere as a vast wind tunnel, the MOUSE could make aerodynamic measurements that would help in designing faster-flying and higher-flying jet and rocket aircraftmeasurements that can't be made in any earth-bound wind tunnel, however big or powerful,

Would Foster U.S. Prestige

In another way, Dr. Singer feels that his modest MOUSE could become a mighty MOUSE: in the prestige it would give us with other peoples, and its psychological effect on any potential aggressor nation. It would boost our technical and scientific achievements sky high. It would shout, "If we can do this on a shoestring, think what we could do with guided missiles on a war budget." END

Tough Guy

Two trucks met on a country road just wide enough for one. Truck driver No. 1, a scrawny, fmil little man, leaned out of his cab.

"Turn out, you!" he shouted, "If ya don't, I'll do to you what I did to the last guy who wouldn't turn out for me."

Two-hundred-pound, muscular driver No. 2, not caring to have trouble, pulled out. But as the other truck rumbled by, he yelled, "What'd ya do to that other guy?"

"Turned out for him," said No. 1.-Wireco Life.

222 POPULAR SCIENCE

Texaco

Tips on car care

de

How to get more mites from your tires

pressure, you won't get maximum mileoge from them. To enjoy longer troublefree life from your tires, see your Texaco
Dealer for regular tire check-ups. He'll inspect the sidewolls for bruises and cuts.
He'll check to make sure each tire is inflated
to the correct pressure. If your tires show signs
of uneven wear, your Texaco Dealer will
detect it, make recommendations accordingly.



Continued from page [16]

"Sure, Lora," Gus said, "Matt, what say we adjourn this until we get back? If you'll get the bailing can, Guy, we can wet these embers down. The woods are wet and the fire's on sand, but there's no point in taking any chances." Grabbing two sticks by their unburnt ends. Gus tossed them into the water. In the dark he could now barely make out Bergstrom's face. "If you'll hold the light for me, Matt, I'd like to take a look at that kicker of yours."

Gus climbed into the boat, found the gas tank half full, and noted that the prop was clear of the bottom. He checked the air valve, set the choke and shoved over the spark. Handing the flash to Matt, he yanked the starter handle. The motor sprang instantly to hie, idling throatily as he eased off the choke. It sounded fine, Gus thought, wondering if Matt would boil over again. He cut the engine, edged past Bergstrom and

stepped ashore.

"Doesn't seem bad now," he said decisively, "but I think you ought to lead the way home, Matt. We'll be along as soon as that fire is wetted down."

Bergstrom was silent for a moment, "Get in the bow, Sally," he said abruptly. "But don't think you've heard the last of this—any of you."

Flickering Farmeell

Matt's engine caught again quickly. The boat turned out into the darkness and picked up speed. As it rounded the point of the cove, Sally winked the flash twice in mute farewell.

"I hope they get along all right," said

Guy doubtfully, "Or do I?"

After Guy shoved off they could still faintly hear the high-pitched beat of the other outboard in the dark. Then Gus fired up his own motor and they shot out of the sheltered cove. Around the point, waves slapped solidly against the hull and spray blew back over Gus until he eased off on the throttle.

"Look!" Guy saw it first—the yellowing beam of a flashlight out on the lake. They headed toward it. In a few moments the dim moonlight revealed the Bergstrom boat, broadside to the waves and rolling deeply. Matt was on his knees flailing at the starter; Sally flicked the tiring flash in merry greeting.

"Can't tow — painters aren't long enough," Gus called above his throttleddown motor, "Grab my gunwale, Matt, and hang on! I'll head back to the cove—too tough into the wind. Guy, take care of it at the bows. Don't get your hands pinched, either of you." He circled and came up alongside with bare steerageway, then fed more power cautiously once the boats were lashed together by two pairs of arms. They headed back precariously, the strain easing as they turned downwind.

Bergstrom Picks Up the Battle

With both boats beached once more, Matt lost no time in regaining the initiative. "I don't know what you did to that motor," he told Guy, "but you sure bollixed it."

"Gus Wilson, I asked you to take me home," snapped Mrs. Adams. "I don't see why you can't just leave him here-let him stew in his own children juices. I suppose we could find room for Sally."

Gus felt an amused irritation. "Nobody's going to get marooned, Lora, I think five people are a bit too much of a load to take across in one haul tonight, but if necessary, I can make two trips."

"That mightn't be easy, Mr. Wilson," giggled Sally. "Remember the problem of the farmer who had to row a wolf and

a lamb over a stream?"

"Before we do that, I'll take a crack at your father's motor," Gus said. "Worth spending a little time if it saves four trips across the lake. That flash is getting feeble—hold it in close, Guy."

Using the tool kit in the boat, Gus pulled and checked the plugs and examined the wires for raw places. He laid the reconnected plugs on the motor, spun the flywheel. Blue voltage snapped

[Continued on page 228]

Things to do before you go:



BUY A NEW BATHING SUIT



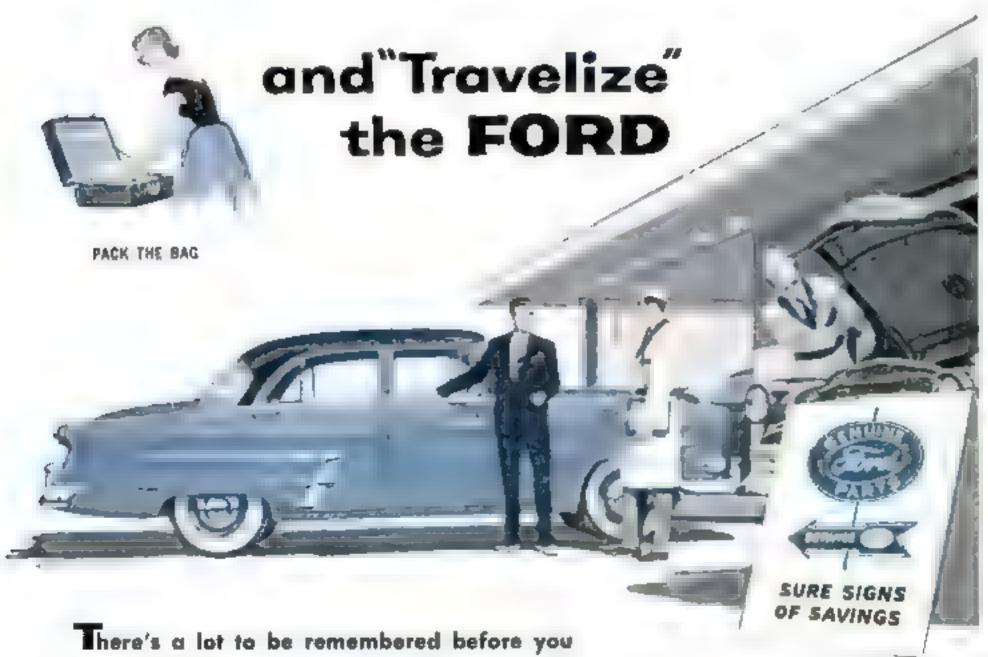
MOW THE LAWN



STOP THE PAPER AND MAIL



STOP THE MILK



There's a lot to be remembered before you go. But don't forget the one thing that can really add most to the pleasure you have getting there: Have your Ford thoroughly checked and "Travelized" now—before you go.

And if replacement parts are called for, remember to insist on Genuine Ford Parts. They're made right to work right to last longer in your Ford.

Every Genuine Ford Part is designed to the same specifications set by the men who originally built your Ford, and thoroughly tested before approval for manufacture. They're your best assurance that your Ford will be fun to drive!

Wherever you go for service insist on Genuine Ford Parts

Make painting easier around your home...



Pointers on painting outdoor furniture, doors, shutters, etc. If old paint is good, wash surface and sand lightly. Do hard-to-reach parts first (chair legs, door edges, etc.). Don't go back over after paint starts to set. Always ...

Use brushes with bristles of Du Pont TYNEX* nylon

You pick up a full load of paint . . . flow it out in a smooth, even cost when your brush has bristles of Du Pont "Tynex" nylon. This means faster, easier, better work on any painting job around your home.

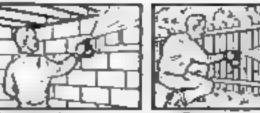
And you'll find that "Tynex" bristles clean easily in any commercial cleaner . . . last up to five times longer than other types of bristles.

Send for free booklet on "How to Choose and Use a Paintbrush Bristled with Du Pont "Tynex' Nylon," Write: E. I. du Pont de Nemoura & Co. (Inc.), Polychemicais Department PS-7, Wilmington, Delaware.

⁴⁴Tynez" is Du Pant's new registered trade-mark for its genuine nylos bristies











No Compressor . . No Electric Cords Needed. Sprays: Palets, Oll, Yarnishas

Insecticides, etc. Men! Women! Here's the easy way to lich those tough tedious fire-some paint jobs. Bether Spray Gun is full to use requires no electricity or Compressors, pressuring by lowcost CO-2 cartridges each sprays up in 21 or containerful Used 5 years successfully in industry. He comment

tupply order direct for daipd, shot Extra cartridges 10 for \$1. SULLIVAN-BECKER CO.

ONLY with box of 10 cortridges

EARN YOUR OWN KING MIDGET. We went refer agents to demonstrate and sel the World a Lowest Priced Two Pas-senser Automobite Pully assembled or bolt together parts If there is no dealer near you send 25c for detailed literature with devers price or \$1 refunded first orders for this plus with devers price or \$1 refunded first order; for this plus actual assembly book and corvice manual.

MIDGET MOTORS MANUFACTURING CO ATMENS CHICA



NEW POWER TOOL CATALOG

Gives full details on wide line of Millers Falls "Dyno-Mits" electric tools - including the most sensational new doct-everything power tool ever developed, Also bearing power too supplies. Now FREE copy. Write at printer. Reserve FREE copy. Write today: MILLERS FALLS COMPANY. Dept. PS-6 Greenfield, Mass.





Red Devil Tool Bel your FREE copy of "NOW TO MAINTAIN WOOD FLOORS." MAIL COUPON TODAY Red Devil Tools, Bept. 127 130 Coit Street, Irvington, N. J. ADDRESS_

ZOME___STATE

MAKE \$15,732.00 IN ONE SUMMER \$9,504.00 WITHOUT LEAVING YOUR HOME

Unless you are near a healthy fire extinguisher or a plentiful supply of WATER. We cannot assume responsibility if this ad breaks out in ROARING FLAMES. So please do stop reading this until you have taken the necessary safety precautions. Yes, we have an item that a H O T -- so H O T that we are not going to say other than the Daual words of a good product for fear of setting this

good magazine on FIRE. This product is NEW! SENSA-TIONAL! COLOSSAL! AMAZING! and REVOLUTION-ARY - NO! No long story - All we have to say, and this is modestly, we have an ELECTRIC ALLY controlled bulb that is the BEST insect killer CONSOLIDATED RE-SEARCH has been able to produce-bar none. Not to be compared with any other unit ever sold

Testimonials like these are pouring in by the hundreds.

"It works like a charm. I am amoved at its results." Mrs. Wills, Atlantic Lity,

"Your magic bulb has at last solved my reach and ity prob-lem Mrs C. I Thompson, Minmi, Fla.

"Has given my family endless hours of comfort living Mr P V Zane, Los Angeles

this have been of the the ers of the William River consults west ose thin sodimes the Bill Wallet document a MISP in ave a consiand excitable near the ng haire ha sales den as the biggest of hiff MARKE his the distinct or he

ABSOLUTELY EVERYONE

Now that you have taken the safety precautions. read every word in this ad, as we have said above, this item is **HOT**, so hot that to be extra safe we have ordered the publishers not to use any RED ink. Now, getting serious, fellows, here's the

scoop. We are going to do EVERYTHING to make you the most welcomed salesman to ever approach a customer. We will give you GLOSSIES, MATS, IMPHINTS, all the material needed for an immediate mail order set up, also documented test reports of how promment colleges and testing labs. RATE our product, also at your disposal is a powerful pulling pitchman sound T V. movie on Bug Weapon, The production

value of this film cost us more than \$2000 00, PLUS BELIEVE IT OR NOT an advertising allowance. We will PRE-SELL that Bug Weapon for you, by launching a tremendous advertising barrage, including almost all national magazines, radio, and TV. The entire population of the U.S. will be put in a buying mood. Especially so since hundreds of insects will help you make every sale. They will dive bomb about him, molest has comfort, interrupt has aleep, destroy has property, and spread contagious diseases about his home, and food. Business estabishments suffer enormously combating the ugiy insect problem. They will greet you with arms wide open. It's a tested natural with STAGGERING public acceptance and mountainous profits. Yes, you will be WELCOMED, you will be THANKED, most important you will make MONEY.

VOLUME SALES CORP., Research Dept. PS-8 2000 Market Street Philadel bin 3, Pa.



Not a godget — net a halfway measure Not to be compared with firmsy, untried Initations. A finished quality appliance, Garries as Ironclad 10-year qualantee and parts replacement policy. Sound by signature.



thes the and reacters are suspected carriers of 3 or o pable dis-eases torophing POLIO, 41 is 45; gate rest stage 8 million others have seen a leave no thing a tatake chatters with 3 sar negleti VES, from can new treer(proof 3 action is with out from a larger I brow out to a familiative by swar-Throw out a standarded by empters and here a professor destroys the bad grad bear occupitated by the bad grad bear occupitate bad grad bear occupitate bad grad bear occupitate bad grad bear occupitate bad grad bear of the bad grade occupitate destruct ve and princes out the destruct ve and princes out the destruct ve and princes out the bad above bear to be a like the bad a section of the bad a section.

ODORLESS • SILENT

ODORLESS . SILENT MYSTERIOUS

DEMONSTRATOR

- England is \$7 M. Send me one unit for my purpoint use
- Enclosing in 12 M in cash which or M O. Rush me are 20th CENTURY BUG WEAPON with sales and and . OWER wholesale prices. However should I become an active sales man you of the Volume Sales Dellet gip to REFUND my \$2.50 must not my devices also MINISTER CHARACTER : FREE Furthermore, I most agree that overpitions you say be true or I will return every Bung for a refund
- Send are MONEY MAKING sales let C.O.D.
- Last Lane is last manny. Bush me daren BUG WEAPONS at your wholesals since. Don't larget to include my FREE demonstrator and sales aids. C 0 D Lost Lane is last many. Push me
- Tagether with the exclaved order don't larget to show me how to make \$4.37 on each \$2.50, \$15,732,00 in one semmer, \$9.504,00 without tenring my home.

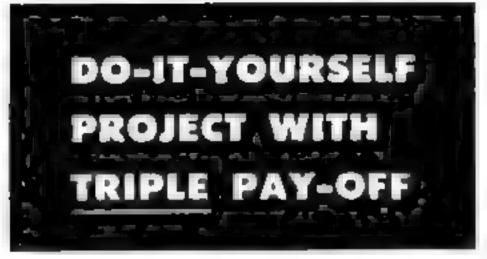
ADDRESS.

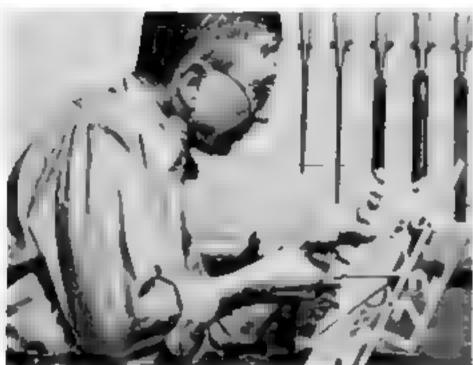
CITY

STATE (Members of the Mall Order Business Surfett)

VOLUME SALES CORP., Research Dept. PS-8 Philadelphia 3, Fa. 2000 Market Street

ABSOLUTELY EVERYONE MAIL THIS COUPON NOW!





In making his own house sign (for example), this man is (1) saving money, (2) adding to the value of his home, and (3) having a lot of fun doing it.

What's more, his pride of achievement is heightened by his possession and use of good files. They're NICHOLSON. This and BLACK DIAMOND are the most famous two brands in the world.

He knows their teeth are sharp, evenly high, of uniform hardness, and have extralong life. They're the choice of both the professional and the exacting amateur craftsman. They've the quality good hardware and tool-supply dealers like to recommend.

PREE—"File Filosophy," Nicholson's femous 48-page (liustrated book on kinds, use and care of files. Shows

and describes many types of files for use on all sorts of projects comprising hard or soft metals, wood, plastics etc. Send for it.

NICHOLSON FILE COMPANY

19 Apera Struct, Pravidence 1, R. L.

(In Canada Micholson File Company of Canada Ltd. Port Hope, Ontario)







NICHOLSON FILES FOR EVERY PURPOSE

Gus Rides Out a Storm [Continued from page 224]

across the points. He turned to the carburetor, squinting in the dim light,

"Sure wish we hadn't doused that fire,"

he said. "This is mean to see."

"I can get another one going right there on the beach," Guy volunteered. "Anyone got any matches?"

Gus felt his pockets, shook his head.

"I don't smoke," rasped Matt.

Clever Fireman

"It doesn't matter—show them what you did before," Sally called from the shore. "Toss me that old flash and I'll get some branches from the dead pine."

The two youngsters pitched in, glad of the chance to show off before their elders. In a moment Sally dumped an armload of pine boughs just above the water's edge, handed the almost worthless light back to Guy, and went back for more. Guy uncoupled the fuel line, drew a cupful of gas into the bailing can and handed it over to Sally, who poured it on the wood. Guy tore a narrow strip from his handkerchief and wet it lightly with gas. He folded it into a pad, checked that the tank was capped and the fuel valve was off.

"All set?"

"You bet."

Using pliers to hold the pad by the end of one plug, Guy hauled on the starter handle. Nothing happened. The second time he tried, snapping sparks ignited the cotton. Carefully holding the flaming little torch with the pliers, Guy stepped ashore and tossed it on the fuel-soaked pine. At once the fire flared.

Treasure Trove-Two Hot Dogs

"Hey, that's pretty slick," Matt said. The warm, dancing light seemed to cheer everyone up. Lora Adams, investigating the picnic hamper, held up two hot dogs she'd found.

"With a frying pan, we could cook up

a little snack," said Mrs. Adams.

"I'll get you a couple of green sticks," Matt told her suddenly, "Wait a second."

[Continued on page 230]



In many communities we need active mechanically-inclined men an deniers to sell and service ROTO HOE and attachments. It's pleasant, outdoor work and you will find it a easy too. These popularly priced power garden tools have won the hearts of tens of thousands of American home owners and gardeners in fact ROTO-HOE is now the largest selling tool of its kind in the world.

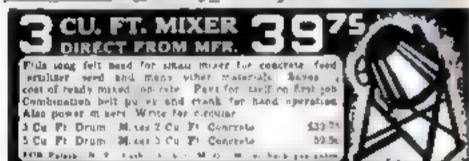
If you are not afraid to get out make calls and demonstrate ROTO HOE and do the small amount of servicing required you should be able to develop your own highly profitable toure time (or ful, time) business on a minimum investment. We furnish you names of prospects in your neighborhood also circulars catalogs, and other sales mater,s.

> Write today for full information—it may be the apportunity you wanted for years!

ROTO-HOE & SPRAYER CO., Box 18, Newbury, Ohio



AMAZING, PERMANENT MAGNETS—WILL NOT WEAKEN! NON ELECTRIC speciation gaths, to make the matter above them from any their and gather hard to reach apose there or drive in a set from assemblings there hard to reach apose there or drive in a set from assemblings the apose of barrelat tacks has a set of the state that the hard tacks has a set of the state that the set of the se



UNITED STATES FORGE AM



NEWEST SENSATION

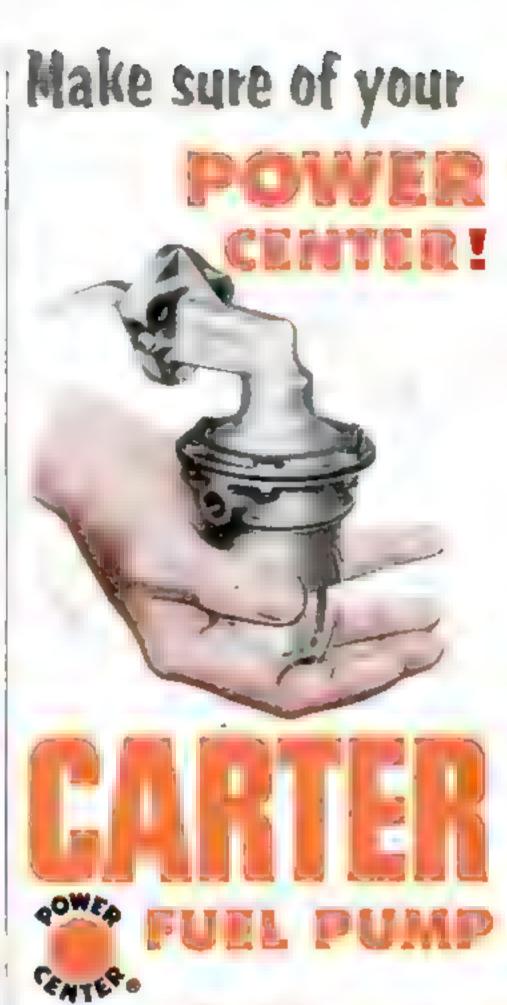
SHOPMASTER, INC



for lasting Home Repairs

PERMANENTLY mends cracks or holes in wood, the, stone or plaster Sticks and stays put Does not chip, shrink or fall out Easy to use Economical Mold it, chises it, polish or paint if If unobtainable from your lumber, paint or hardware dealer, the big 4-lb. can will be sent you postpaid (in US) for only \$1.25. Full money-back guarantee. order now.

DONALD DURHAM CO. Bex 804-U, Dos Moines, Iowa



Your Cars Best Protection Against Fuel Pump Failure

Here's a fuel pump that'll never let you downthe most dependable ever developed. Its extra capacity and durability combine to assure years of steady, smooth-pumping action under the roughest, toughest driving conditions.

See your nearby Corter dealer, He's listed under CARRETER in the yellow pages of your phone book.





WHAT'S YOUR "SHAVING?" Want your short cut or shop trick printed? Send it to United Status Plywood Corp., Box N Y. 36. N Y If used, we'll send you a one year subscription to this magazine. All entries become our property. None can be returned.

NOTHING CRUMBY ABOUT THIS, Take the wife's breadboard and cut a shallow rabbet all the way around. Now gave and screw a frame to the edge of the board, flush with the cutting surface. Crumbs from cutting just fall into the rabbee.

LIKE A HAPPY MARRIAGE. If you want wood joints to last, use Weldwood Plastic Resin Glue. It makes a bond stronger than the wood itself. And it gets stronger as it ages. Always in perfect condition when you want to use it, because you max at yourself from the powder, in a few seconds. Stainfree, rot-proof, highly water resistant, inexpensive. America's largest selling wood glue.



HELP BY THE BOOKFUL, Ask The Government Printing Office, Washington 25, D.C., to send you FREE, 'Hobby Publications'—a list of booklets from which you can select many useful volumes.

"LOOKS LIKE A MILLION." Here's a sure easy way to get that costly hand-rubbed "natural" finish on wood tables, book shelves, cabinets, etc. Use easy-to-apply Saturdae. Works on any wood, hard, soft, solid, or ply. Satinlac doesn't look "built-up"; doesn't darken the wood or turn yellow. Gives "pro" results and protects the wood.

NO HITS - NO ERRORS, Here's how you can banish accidental hammer dents in wood surfaces. Cut a hole through a piece of heavy cardboard. Slip it down over the nail it will take the deat if your hammer misses.

A PRETTY PICKLE YOU'LL LIKE. Those luxurious pickled or blond wood finishes you see in the fashionable furniture stores are easily yours. Use White Firzite for blonding or pickling. For pastel tones, tint White Firzite with colorsin-oil. You'll get exciting professional results on any wood!

TRICK OF THE FAINTER'S TRADE. On soft wood or fir plywood stain jobs, you can tame that "wild" grain with a coat of Clear Firzite. Gives that smooth expensive-wood finish.



MEIDMOOD . Plustic Resin Glue Makes a bond wood itself Highly water resistant.



PIRZITE® White for pickled or bland effects. Citar tames wild grain on stain jobs.



SATINLAC . Pot exquisite natural wood finish Enhances papural grain, picserves the surface.

At hardware, paint, lumber dealers.

United States Plywood Corporation Dept. 136, 55 West 44 St., New York 36, N. Y. Send me free leaflets on Weldwood Plastic Resin Glue, Firzite and Satinlac.

N	M	WĘ.	_
			-

Gus Rides Out a Storm

[Continued from page 228]

He trotted up to the edge of the woods. Gus smiled as he worked over the carburetor. The float needle moved freely and there was no grit or sediment inside. He uncoupled both ends of the gas line and drew out a two-inch bronze filter element. The line was clear, Taking up the metal filter element, he shook it. blew through it until his cheeks bulged, and stared at it for a moment.

Then he did a strange thing. Laving the filter element on the seat, he drove the point of his knife right through it. He blew through it again, and then carefully reassembled the parts.

"Now," he said with conviction, "we can go home."

"Darndest thing I ever saw, Gus," said Matt, "the way you drove a knife right through that thing like butter."

Motor Starved by Clogged Filter

"It's not hard. The filter is a kind of spongy bronze-it works fine, stops dirt or water dead in its tracks. Like any filter, it clogs up if it has too much work to do. When it's almost saturated with water it will starve a motor, but let enough gas through for idling. Let the motor sit a while, and enough gas will dribble through into the carburetor to run at full throttle for a few minutes.

"In the shop you can blow out the trapped water with compressed air, but I put a sht through just in case. May be a little water-spitting from the motor, but I doubt it."

"If you great brains have that problem licked," said Mrs. Adams with amiable tartness, "maybe you'll tell me how to divide up two roasted hot dogs among five people.

"Three people," corrected Guy, who was sitting by the fire with his girl. "Sal and I can't eat and harmonize at the same time." They sang a chorus of "Show Me the Way to Go Home" and it seemed to Gus, whose ear was better tuned to knocking than to flatting, that it was darned nice music.

NEXT MONTH: Gua closes a sticky case.

Released

PESCO GEAR TYPE HYDRAULIC PUMP Compact — Pawerful — Reliable



OTEM = 140-1.c recally designed for belt or se from far be t power ake grive pulle; ulf elected digital or mindle gas er gige Equally shills or for larest some the

Pedestal type incorping with we best barres for "a" sold low bed a Stand and " of jupe toread links and our reporty Delivers 1.5 (d'M at 000 I'M) at 000 RUM with 3 HE Wills actuate ore ftem #2: s. alig" bore stroke cylinder in 18 seronse Hardened a eel gears turn in occase she to runke hearings feld at Landeh crockwise facing abata G arapterd trouble free service. Ship 22.50 wi FOB

SELF-PRIMING HAND FLUID PUMP



ORDER DIRECT FROM AD **INTERPOLION GUARANTEED**

Send Payment Or Purchase Order Today

FREE FALL EDITION War hanr.

BRONZE & MONEL BALL BEARING



ITEM # 204 For-GNECT -Comptag and Spraying of D.D.T. inse as Shahow Well Pump . For Sprinklers . Home Water Systems ... For Samp Pump . For P T it | Parcet or Pulley Brite . Rated & G P M as 5 G P M at 1500 R P M 36 G, P M

wan if P.M. . Presintes to "ad P.S.I. . I'se 5, 16 a H P . 1" Pipe · out 24.50

Brand Now Poscu

HYDRAULIC CONTROL VALVE FOR SAFE POSITIVE CONTROL OF HYDRAULIC CYCHNOERS AND MD-TORS O RELITIVE RESILE VALVE (SCHORY SEE AS 1200 P.S.) O FOLK WAY VALVE to operate one double at the Carlot Carlotte of the Carlotte o ar (ng cy) note: • D2FN IINTER
r; ouler as locked in positive and
straint firster, 70 NFITRAL
PURNISH • ANNIE STAINED INTO

no one for most de connier co d o at 15 0 P S t 14" Challes Light

ITEM 2371V in measead

BALANCED d valve

HYDRAULIC SPEED REDUCER GROBAN with PINGERTIP CONTROL



Miliat Gars & Feed Mills & Mid. of Cars & Feed Mills & Carn og Machines & Conveyers & Lithes & Milling Machines & Milling Machines & Motor Boats & Credm Separators & Carden Tractors est speed from the en-SHAFT

must been couples. handle easeking handse manusalna ing the sign power the R P Shafts has sufficiently merch from Lugar when the buy whaft hepatt 75-1 If the Martin the area of the transfer of the area of the a the String wit In the Compression in the String with I take and Fig. in runtions. If it is the Array 54.50

ANP. D. C. GENERATOR IDEAL FOR WELDING GENERATORS Type R L. ITEM 94 Ampre 10 by Jack & He mrs Govekaanent. 40

that a then the share was 35 for 1st the companies to a \$100 g. a companies Countriete with morner Sunnect as Welder 35.00

HYDRAULIC CYLINDER

TEM #310 P at hore 11" wroter 4 box steel cylinder wall Misro-Honest and at steel 119" dismetry potent rud (85 g* potent) pogti-ed Cyste in nastig at boss a d dismeter and the term menting of the and shall will be the term of the shall be a shall be the shall be t we have My at the 1 to 1 to 100 thread



BLACXHAWK HAND-HYDRAULIC PUMP

TEM = 82, Perfect for Persons Ha braulte Staw Plaws Parm Warms Jacks and Magana Jacks and Farm Pows A few easy strokes of the 127 hand o had sout each it South the burner of the Historial Complete with both in 121 complete with both in 121 complete with both in 122 complete with the 122 tribush baye

Lands Black Hand Joseph Dine 1974 19 Worth much



No. W. 12 22.50

TO PLACE PHONE ORDERS CALL WEbster 8-2782

HEET METAL

Senges, Pitters alar Pitt-bury's miles of Compared by mount hipsi ed stated | hispiress 107 (13 to 928 55) reflect to the

in", 75 the \$15 (1) de"

100 (be \$18 to 480 to 1)

when there a not at the \$17 for the sector is course, an the \$21 50 (see \$180 to 480 to 1)

\$21 50 (see \$180 to 480 to 1)

\$21 50 (see \$180 to 1)

\$22 50 to 10 to 10

SUPPLY CO. Base 195-1 AVE., CHICAGO S, ILL.

SUPPLY: BRAND NEW, BALL-BEARING \$1/4-MP, 2-MP, 3-MP ELECTRIC MOTORS FAMOUS BRAND! SAVE WAY OVER HALF!

Prescribe I agree that or specimen with heavy start in turning to hand a FARMY heavy starts had. Now, but heaving mosts a but mosted IN ANY Physipples of a 117M, 11 200 units. 40 cy., single phase firsted for save, District a first blooked [N ANY PROSITED STATE OF SAME AND ANY PROSITED STATE OF SAME AND ASSESSMENT OF SAME ASSESSME

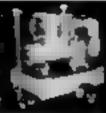
\$47.50 feb 11/2-MP, Regularly \$110.00, Special sale 2-MP, Regularly \$130.00, Special sale. \$57.30 feb Regularly \$760.00. Special sale \$75.00 feb CATALOG OF MOTORS and ELECTRICAL EQUIPMENT MOBERTS ELECTRIC Co., Dopt. S-206, 848 W. Drand, Chicago 22, 16-

VYKE MFG. CO., \$-2439 15 \$t., Denver 2, Colo.

der welder



Type Arc Husby Bay & For Indoor, deldeer walding



Check and mail: with some gad oddies today!

Husky Nev AC Teans Type Hobort Trade School, Gl opproved. FREE booklet.

COUPOR

Cash in on the big demand for depend able are welders. Set up your own shop

-full or part time -with a Mobart and stort corning hundreds of extra daltars

HOBART BROTHERS COMPANY, BOX P-84, TROY, OHIO, U.S.A. Phone 21222 :-----

See it! Living plant and animal life in and around your house. Free Micro-Manual tells you how to use, where to look. OVER 3,000 in use in schools, universities, by hobbyists, fax cysplete

Included in purchase price, 4X, 4X, 54X, 52X symptotes available. See catalog, Excellent optics throughout Plano, concave mirror, 4-aptriare displaying, condenser. Triple revolving turret. All metal, beavy and substantial. Mechanical stage is \$14.98 extra. Shipped in Stied hardwood cablest, insured

Made by quality Japanese optical sufra, to our rigid designs and special agency money-wack suggestion. One third deposit on C.O.D. Calif., resid. and 375 state tax. Schools and Bugiers Inquire.

196-340-460 POWER MODEL 436

FREE Micro-manual & 44 pg. Catalog shipped with order or mailed free on request. Microscopes from \$9.05 up - telescopes, isonoculars, slidy-making supplies. -

[®]AKROΠ 107 AKRON BLDG. 4378 SUMBET BLVD., LOS ANGELES \$7, CALIFORNIA





Safe, Powerful, Rugged

Rustless aluminum construction. Weighs only 4% lbs 7" hardened steel blade. Dis-cast motor housing keeps out moisture, dirt and grass. Fully insulated handle encloses wiring, prevents tangling in shrubs and plants.

Jam-Proof Clutch

Blade Stope Automatically upon striking rocks, hummacks or other obstructions. Prevents motor and switch burnouts.

Clear-Vision Guard gives view of blade path when trimming close to plants.

Toggle - Switch in Handle always within convenient reach.

Strain Reliever prevents damaging strains on card.

A Practical Reliable Tool for long, heavy-duty service.

	itreet, Syrocuse 8, N. Y.
No. 134.	complete details and name of near- your "Yardmoster" Grass Trimmer
Name	AND
Street	
	County State
In Con	oda write Strongridge, Ltd., Weston St., Loridon, Ont

The Truth About Your Brakes [Continued from page 194]

Suppose a car is put to a standard fade test. Accelerate it to 75 and brake it down to zero at a standardized high deceleration—just shy of sliding rubber. Repeat the cycle immediately, for up to a hundred times. As the brakes grow hotter, the required pedal pressure climbs up. If the car is a bad fader, you'll reach a point where you can't get the standardized high deceleration no matter how hard you push. More likely you'll reach a kind of stability. Needful pedal pressure may climb up 30 or 35 percent, then level off and hold.

What happens, of course, is that the brakes have become as heat-soaked as they will get. It follows that everything designers can do to lower this stabilized temperature helps control fade. Most past work has been on metallurgy and heat transfer inside the brakes. In the future there'll probably be more attention to air flow outside, including ducting, fanlike disk wheels, and more fins.

Decelostats yet. On a crash stop with all four wheels sliding, you have almost no directional control. A rolling wheel wants to go where it's pointed; a sliding one doesn't give a hoot where it goes. One possible answer to high-deceleration swerves is the "decelostat" or brake governor. This is a rotation-sensitive dingus that instantly and slightly eases braking on a sliding wheel.

Similar devices work well on trains, to prevent "flat" wheels, and on aircraft, where a blowout caused by a locked wheel on the landing run-out can be bad business. Preliminary proving-ground work suggests that governors may help a bit on fast-stop swerves. Detroit people are close-mouthed here.

Riding in Style

The teacher had been giving the class a description of different kinds of railroad cars and she paused to ask if anyone knew what cars that carried cattle were called. A moment of silence, and Johnny called out, "I know, they are Cattleacs."—L & N Magazine.





Highly accurate and versatile for better than average work 10" swing. Send for free catmon.

SOUTH BEND LATHE South Bend 22, Ind





1 Ton Power Seach Type Make Your Shap Complete

Pawertul * Dependable * Economical

finelly make your own dies for light stampings forming that the circ literation produced ments work Replaces make as a make present Land \$4 to \$2 M Propert Working 10 M Property Working 10 M Property 10 M Propert

ALVA E. ALLEN, Dool PS, Clinton, Missouri





Model 6-12P \$16.50 Paxipald

ng and spacing of ter b sharpens Here Extra Feature-Adjustable Safe-

ty-Rust provints tilting or gaverno Londiere with patented Index Plate mitte block and \$3 thi Grinding Wheel nothing extra to his saves time and money Sped check resh so ments wides " not purious Order too a today

QUICK-WAY Saw Company 100 Heraby Orive Painted Past N Y



New wonder-way to dry clean rugs can start you earning big money every day! Full or part time. Homes, stores, offices are prospects! Amazing American ALM-13 machine with exclusive new Float-Action Whirling Brush does the work-so easy a child can operate it! Just spread drycleaning material on rug . . . then guide machine while brush whirls this material thoroughly into fibers of rug. Out comes grease, grime and deep-down dirt! Pick up with vacuum. Rug can be used immediately. Clean rugs on location. No hand scrubbing. Does professional job in a jiffy . . . makes rugs new-looking! Minimum investment. Write today for details! Make extra profits—use same machine to clean floors, too! Easy-to-use ALM-13 does five floor jobs with no-tool attachments . scrubbing, steel wooling, buffing, polishing, waxing . . . wood, rubber, asphalt, linoleum . . . make money on all floors!



BIG PAY SANDING FLOORS

Get ahead in fast-growing building field! Be a floor surfacing contractor and sand both new and old floors. No experience needed. High earnings, steady work with a future! Write for booklet "Opportunities in Floor Surfacing," enclosing 25 cents in corn or stamps to cover handling.

OOR MACHINES

ı	_
1	The same of
	SENT
1	
•	

	The American Floor Surfacing Machine Co. 532 So. St. Clair St., Toledo 3, Ohio Send full details on new easy way to Dry Clean Rugs and make money!
	Here is 25c in stamps or coin for booklet "Oppor- tunities in Floor Surfacing, telling me how I can start my own floor sanding business.
	Name
	Screet
L	CityState

Do it with DREMEL Straight-Line Action Sanders

Get perfect finishes...no gouges ... no scratches...no swirls!

For the finest finish sanding, take a tip from the professional craftsmen-insist on Dremel Straight-Line Action Sanders. They save you money when you buy them. They save time, labor, and expense when you use them. And they're guaranteed to produce finer finishes because straight-line action sands with-thegrain-prevents cross-grain scratches and orbital swirls. Hobbyist, jack-of-all-work, or professional-there's a Dremel Sander for your

Of the four common sunding actions, only Dramel sunds 100% with-the-grain - the only government acratch-free action approved by finishing experts









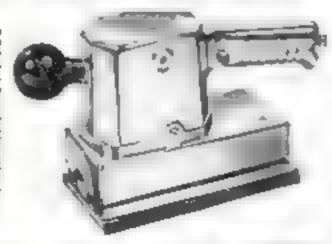






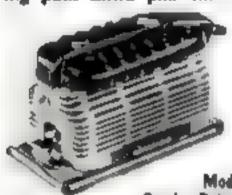
NEW MODEL "53" SANDER WITH POWERFUL BALL-BEARING ROTARY MOTOR

This pow entrop is a trade at the party of the matter point. The first of the party of the party



EXCLUSIVE! Model has a quick-action detachable sanding pad. Extra pad turnished free.



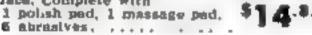


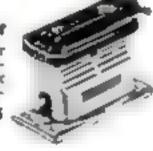
Perfect for small show he me use Peatures theme! Steacht recalled As that he had recalled took mean by mother 14 100 strokes ber min by 5 10 21 on in canding our

Price nesidest Study steel earry-les case Mutel 2000' Sander Padather I polish \$24.50 \$7 A.50 physician

Model ' A" Sander-Poisbor-Massager

Three too's in one! Lighter capacity for general-curpose use. Features Straight-Line Action, high speed reciprocating motor Wt. 21; lbs., 12 sq. in sending sur-face, Complete with 1 polish ped, 1 massage pad. \$14.85







SEE YOUR DEALER: If he cannot supply, order direct on 5-day trial, morey-back guarantee. Remit in full for postpd, shipment: or send \$2, pay postmin balance plus postage and COD.

MFG. CO., Dept. 124-H, Racine, Wis.

234 POPULAR SCIENCE

Building a Yesla [Continued from page

small capacitors, but they the same voltage rating. Cr C1 until the healthiest core

all be of ie altering obtained.

The plate of the tube may glow dull red. This is normal and no cause for alarm. But if prolonged operation brings the plate up to an orange or vellow glow, the plate switch should immediately be turned off and the tube allowed to cool, with the filament left on. If the tube tends to overheat constantly, change the grid resistor to one of 5,000 ohms.

Keep off the air waves. Since the Tesla



THE FRONT PANEL, shown above, carries the two toggle switches and a grommet through which the line cord and the ground wire pass. Tape the ground safety wire to the line cord every few inches and attach on alligator clip to the end of it. When plugging in the outfit, fasten the clip to the screw holding the cover plate of your household power outlet, backing the screw out a bit if necessary. This grounds all of the exposed parts for safety.

coil shown is sharply tuned to a frequency off the broadcast band, it should cause less interference on radio and television than an are welder, electric shaver or other sparking device.

However, harmonics or stray frequencies may cause a buzz at certain points on the dial of a radio placed only a few feet away. Moving the radio or the coil a short distance may clear this up.

Connect only small objects to the highvoltage terminals. Avoid large plates or long wires, as these radiate excessively, and may cause radio interference, besides stealing power from the corona effects. Be sure you always ground the power clip before switching on the unit. END QUALITY TOOLS at a Savings up to 60% ".

1 F

ONLY THE EACH FOR POREST LIMPORTED PRECISION PLIERS

For Jamelors, Optical Workers, Hubbyests, Craftimen of all took. These suports florman improvements are of drop-forgod, heat-tracted high quality lost stool, falmicated, ground and polithed to made execute specifications. Smooth working joints, Jave. meet perfectly to hold the most delicate objects, Each pilor of 4' long and a year of pracision and strongth, T types to choose from Flat News, Round Ness. Snipe, Combination, Diagonal, End Cutting Nippers, or 4 Side Plat and 1 Side Reund.



3 Per Printe fet



Finest drop forgod imported steel. Grand and patiend bands, political finish, and teached handles for natur pip, individually puck-sted in heat senior plactic let, I—Lungaman Stip James, 2" I—Lung Pione, 1 %

I-Diegonal, 5 lb

complete set pastpaid \$2.96

& FOOT WOOD FOLDING LULES

Made of well seasoned fumber with matal Happed ands and spring jourly, interferent are sharp and slear, graduated in little, it fount



49c postpoid

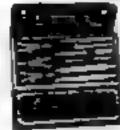
ALUMNISM UME A POCHET LIVEL

hinds of hard abstitute taking, \$4 all" havegoral shops. with I stordy hooks for honging on line. Equipped with me out, feeled for according.

11 Pr. BRAFFING SET

High have drawn plated intro mark of automotop quality and socuracy Set unlades Plan and England Son Divides, Compasses for one with mit or panel. faling Pear and all recentry parts. Packed in a valual lined, grap

Campleto Set — \$3,29 paripaid



A PL. METAL CHTTMA PILE SET

Made from the hest quality topi steel, designed for the requirements of ma-phasics, instrument metals and prophy craftson. Compartmented plantic kit comtong the following \$50° long needle flor with round shade and high test carring qualities: round, half-round, flor and beile, square. The complete sat puripare

4 Fe. BROF-FORGED TANG CHISEL SET

Impered and hurdened had yied. Swedish pattern, of high quality haseled and patiebad. Hardwood, bother typed handles. Set contains was each 1/2" 1/2" 1/4 and 1" chool in plants compartners lit.



POLISHED STEEL VERNIER CALIPERS

Imported procuses astroment of \$" measusing expanity with minds and quitide year, depth gauge and fraction rates adjustment Graduations, 7-16, and 1-32, version " readings 120".

\$1,39 personal

12" WORK MINCH LEVEL

Made of hardward boods, life dried and tempored. Squepped with haracental and plumb old. Harimond and opened with a steel plate MPL. ______ Stg. pt \$8c 10-

DI MANAGEM CHOSE SEND CHECK OR MCME CADER IN C. D YOU PAY PONTAGE AND COLD. CHARGE MONEY

-HILL FALLER

ILLUSTRATED CATALOG

20 Pa. THOMPS-TOWNS SHAME speno boks, but Topodoly blade the Spent Selling

Firest alloy sheet drills, hardened and process ground to the sharpest long estimating cutting page obtainable will easily and clearly belt through hard woods, plactics, alarmours, iron, and the toughout steak. Deconsistenally querarrived for thousands of drillings. Full

hippelongth, formed down in the larger diameters in that all sizes for unto 1 '6' pipetrie drille. Sixed by 64ths from 1.46" to 2.2" pasted to a startly plastic faul rall with individual portiets.

13 Pc. NIGH SPEED DRILL SET Made of finest hardened tool steel Especially designed for High Speed electric drilling Heraugh the hardest metal, steel and exect full jubbers lengths and are pecked in a styrely metal make. Scan by 10ths. from \$3.90 nor price only \$2.98.

HUMBREDS OF TOOL & TODE RITS 25 PEFUNDED DE



4 Pr. POWER AVEER BIT SET Approximately 1971 blade of finest tool steel specially tempered and hardened by give years of much, clean, very drilling, Shanks will fir

all electric drills Packed in sharpy beat-treated, compartmented plants had rell. Size: 16, 19, 16, 367, 16

\$2.29 complete set postpaid

DRILL STAND

Restance codesium plated, will hald 21 Jobber or Letter Drib. Stands uproper an shall or bands. Drill since plainly marked on each opening. Steed by 64ths from 1/16" **知 秋阳。**

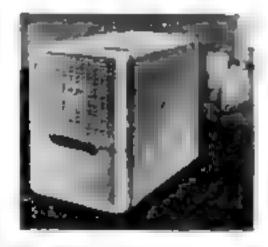


48x pertonid

611 BROADWAY, BEPT. MS-P, NEW YORK 12, N. Y.

STOP MOISTURE DAMAGE FOR GOOD!

Just plug in the amazing FRIGIDAIRE Electric DEHUMIDIFIER



Only 18'4" high - 201/3" long - 11'4" wide

Positively controls moisture in basements, linen closets, playrooms, workshops—or any closed area up to 10,000 cu. ft., where moisture is a problem,

Plug into any convenient outlet. Fan draws moist air through refrigerated coil. Moisture is condensed and collected in container. Dry, filtered air flows into room.

See your Frigidaire Dealer for further details. Or write for free folder to Frigidaire, Dept. 2251, Dayton I. Ohio, In Canada, Toronto 13, Ontario.



Built and backed by General Motors

with MASONITE PRESDWOOD

It's different! Attractive! And easy to make! Use tough, grainless Masonite Tempered Presdwood . Resists heat and cold, wind and water. Lasts indefinitely. Plan can also be used for a woven fence. See your building materials dealer. Send for "Idea Book" and carport plan No. AE-296. 3 5

PRESDWOOD MOOD MADE BETTER

Best. PS-6, Bex 777, Chicago 90, 61,

Please send as plan No AE-298 for corport and your "Idea Book," I am outlaing 10c for hundling and postage,

"Mospoite" signifies that Mospoite Corporation is the source of the product



Now-an easy way to wash your car!

JUST SPONGE IT ON -RINSE IT OFF!

FAST-ACTING, ECONOMICAL DU PONT CAR WASH

NEW DU PONT CAR WASH cleans faster and easier than you ever thought possible. Just sponge it on . . . rinse it off . . . and your car dries itself. No wiping or chamois work! Du Pont Car Wash gets off all the grease and grime . . . leaves your car spotless.



One tablespoonful washes your car. Half-pound can gives 20 washes!

PU PONT Nº 7. PRODUCTS
from Chemical Research . . . For Easier Car Care



BETTER THINGS FOR SETTING LIVING ... THEOLIGH CHEMISTRY

236 POPULAR SCIENCE

America's Best Young Driver [Continued from page 83]

As an added hazard, national Road-e-o cars—in both the skill test and the road check—carry little black boxes known as jerk recorders. Sudden starts and stops set pendulums to swinging and a counting device to clicking. Road-e-o judges know that in order to drive smoothly, you have to anticipate turns, stops and lane changes.

The Road-e-o's written quizzes become progressively harder, but even at the local level they demand more information than many an adult driver has bothered to acquire. Last year's national champ got 59 out of the 60 questions.

Each national finalist also gets a workout on an auto-training device. Sitting at the controls of an ordinary car, he guides a tiny model auto on a moving belt painted to look like a highway. As the road rushes by, it confronts him with a variety of problems. At the same time, a little sign box flashes instructions, and a miniature traffic light keeps changing. The driver's mistakes and reaction times are automatically recorded.

His Driving Took Him to College

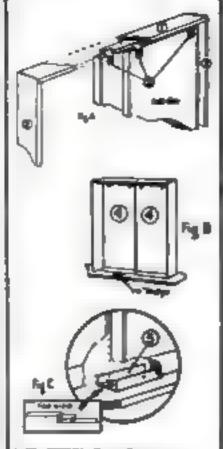
Martin Desilets, the first national champion, entered the Road-e-o because he needed the prize money to study engineering. His first-place money got him to the University of Virgima for a year and a half; then he decided to quit school temporarily and get his military service over with. Now he's in the Air Force.

The runner-up that year, Milton Vaverek of Pontiae, Mich., had quite another problem, a foot crippled in infancy by polio. He flew home from the national Road-e-o on a Sunday morning and entered a hospital that afternoon for an operation. His money went for the bills.

Last year's winner, Jim Miholick, interested both in automotive engineering and music, planned to enter the University of Hawaii. Martin Burley of Fargo, N.D., runner-up, is studying architecture at North Dakota State. Frederick Betz of Baltimore, third-place winner, entered

[Continued on page 238]





- · Eary to Install and maintain
- · Cost less than ardinary doors
- Sove up to 35% in floor space . Stude silently without binding
 - Guaranteed against warping in excess of % when properly installed and finished.

Novoply Sliding Door Units by

Weldwood



World's Largest Plywood Organization

Waldwood Building, 35 W. 44th St., New York 36, N. Y. U. S.-Mengel Plywoods, Inc. • Louisville, Kentucky

ONE SURE WAY TO KNOW YOU ARE BUYING A FINE POWER DRILL For top performance choose the power drill equipped with a Supreme Chuck Or replace your old style chuck with a Supreme. See your hardware dealer Supreme. See your hardware dealer Supreme. See your hardware dealer

SUPREME PRODUCTS, INC., 2222 S. CALUMET, CHICAGO 16

ADD A CLOSET

with a NOVOPLY Sliding Door Unit

Family cramped for closet space? Make a closet and face it off with a Novoply Sliding Door Unit. It includes everything you'll need in one complete package—jambs, header with track, roller track hangers, doors with pulls and floor guides.

HIRE'S ALL TOU DO:

- 1. Assemble header (1) and jambs (2) and place in rough opening. Shim jambs to make frome square.
- 2. Place adjustable overhead roller corriers (3) in grooves of overhead track in header (1).
- 3. Adjust doors with wedge (Fig. 8) and secure with screw in corrier.
- 4. Install door guide clip (5) in floor (Fig. C).

You can have units ranging in height from 6' 91/2" to 8'; in width from 2' to 8'. Several together make a modern storage wall. Doors can be stained or left natural. Units available with or without upper storage area; in Novoply or genuine birch.

See your lumber dealer or send today

for free folder.



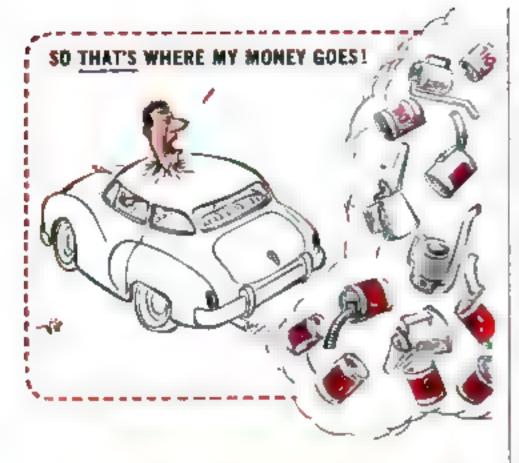
Favorite of home owners and craftsmen for 20 years! SPEEDY SPRAYER gives your work that professional paint hush everyone admires. Sprays paint, enamel, varnish, lacquer, etc. . . 4 to 7 times faster than hand brushing! Lightweight, portable, uses any \(\frac{1}{2}\) H P, motor, Improved disphragm principle assures clean, oil-free air, You'll find dozens

principle assures clean, oil-free air. You'll find dozens of time and money saving uses for SPFEDY SPRAYER, including spraying insecticides 2-4-D and DDT. Complete outfit, without motor, only \$36.50

At leading hardware, lumber, and auto supply dealers. PREE—write for bandy booklet "How to Spray."

W. R. BROWN CORPORATION

2637 N. Normondy Ave. 💌 Chicago 35, III.



This oil-pumper needs Tough-but-oh-so-gentle piston rings*

Oil-pumping is just the start of expense and trouble the first danger signal from worn-out piston rings. The longer you let those old rings stay in, the more oil you'll use, the more power you'll lose, and the bigger your repair bill will be!

As your engine gets older, it runs hotter because of accumulations in the cooling system. The cylinders wear tapered and out-of-round—need more oil on the walls.

It requires a special type of piston rings—replacement rings—to deliver this extra oil, under full control, without waste.

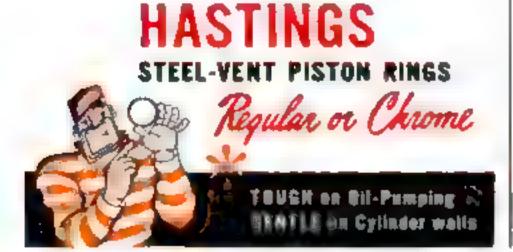
Hustings pioneered in the development of steel oilcontrol rings and revolutionized the entire piston ring industry. Hustings makes replacement rings exclusively, devotes all its research, on the highways and in the laboratory, to the particular replacement problems of each make and type of engine.

That's why Hastings Rings stop oil-pumping, check cylinder wear, restors engine performance—in re-ring, re-bore and re-sleeve installations.

So go to your motor specialist at the first sign of oilpumping or performance drop-off. If rings are the trouble, ask him to install a Hastings Steel-Vent replacement set. Truly the best money you can spend on your carl

HASTINGS MANUFACTURING COMPANY - HASTINGS, MICHIGAN HASTINGS, LTD., TORONTO

Piston Rings, Casite, Casiube, Drout, OH Filters, Spark Pings



America's Best Young Driver [Lanuaged from page 236]

Johns Hopkins to study civil engineering.

Most of the top teen-age drivers practiced hard for the Road-e-o, after getting an idea from the local contest about what to expect. Desilets laid out an obstacle course in a nearby park; Vaverek, on the family farm, where he'd begun driving at 10; Betz, on a dead-end street. Mell Carey of Berkeley, Calif., a national finalist for two years straight, practiced weekends on a school playground.

Kids Want Earlier Training

After last year's finals, the entrants got together to discuss good driving. Carey argued that since driving is an art, it ought to be started as early as possible. He suggested that use-at-your-own-risk areas be set aside for beginners, but that licenses should be granted only after a difficult test.

Most of the others agreed that behindthe-wheel training ought to be started earlier than it often is—say at 14. Driver education is compulsory for St. Louis. Mo., high-school seniors, Jerry Kassing pointed out, but by that time "most of the kids have been driving for two years and they already have bad habits."

Several criticized school officials who balk at thoroughgoing driver-education programs because of expense. C. A. Tovey of Jacksonville, who represented Florida twice in a row, put it this way: "My instructor said it costs \$3,800 to put a youngster through high school, But what's the point if a kid gets killed in an accident on graduation day?"

END

It's a Long Road

An irate cluef engineer was inspecting a stretch of newly built road, accompanied by the foreman in charge of the gang.

He pointed out to the bewildered foreman that the shoulder beds were off, that the curves were banked wrong, that the foundation was not right, that the leveling was far from perfect.

Finally, after the avalanche of criticism, the old foreman spat on the ground, gave his superior a bland look, and asked: "Well, how is it for length?"—Pure Oil News.

it's easy to make these

You can make loose metal, wood, or plastic parts tight; anchor bolts in concrete to stay; seal cracks in metal; tighten loose screws and fixtures in wood, metal or tile-with Smooth-On No. 1. the iron cement of many uses. Just mix, and fix. Smooth-On No. 1 hardens quickly like iron, and expands as it sets. Forced into any opening, its unique expanding action makes the repair. Keep a can on hand, it will not deteriorate. Smooth-On No. 1 is at your hardware store.



FREE Repair Handbook

48 pages, many illustrations, easy directions for ingenious time and money saving repairs you can make yourself. Write for your free copy

SMOOTH-ON MFG, CO., Dept. 58-H 570 Communipaw Ave., Jersey City 4, N. J., U.S.A.

SMOOTH-ON

RETAIL PRICE \$125 00

FACTORY TO YOU \$7**0**%

SUPERSHOP includes procisionbuilt 8" tilting table saw, vertical and herisontal drill press, 30" fathe, sander, grinder. 100% BALL SEARING.

catalog, full details, trial plan. POWER TOOLS, INC.



262 YATES AVE. BELOIT, WISC.

USED AS JOINTER



50 EASY: With this new iting of and jointer anyone can now sharpen any rate saw like new? When the bits hardened sheel rollers teeth are intelled and EXALT I NAME HEILBIT, A I treth cut and new cuts true and amounts. Ju and instructions \$2.85 postpaid Free attenture.



SHARPEN YOUR CIRCULAR SAWS The RIGHT WAY on your own caw table. Sharpens rip, cutoff, bollow ground and comb nation blades -0" to 10". Saws stay round with correct bevel Precision made.

The part of the Cartaling wheel.

"TRU-CIRCLE" aw

lealty of to teeth or more \$2.95. AT DEALERS OR POSTPAID

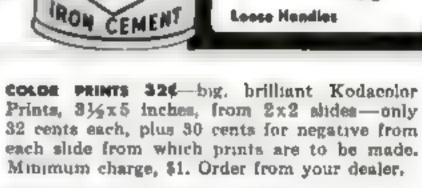
UPER DRILL GRINDER SUPER DOWEI



CENTERS

Points are emcentile. These centers take all sizes of dowels from "" ra the inegest made littell all your boies at same time Tou'll only need these 6, why huy more 4 tenters \$1.00

L C. McBURNEY, 1908 Hollywood Bivd., Hollywood 28, Car., Dept. S-44



MODIFIED IN

Pipe Legis

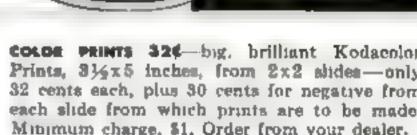
SMOOTH ON

Loose Strows

Loose Handles

Bastman Kodok Company, Rochester 4, N. Y.

COMPLETELY AUTOMATIC



STOPS LEAKS

No. 1



4 f.C C. specifications

All Lungs shipped with: 2" chrome test-gauge, wrench and instructions.

OPEN CIRCUIT TYPE Concade at the nation of the testing of the us sucpends to Diving lange Mine Sarty Appraises Go-Annuals Devan Agent r The sales a dat to sale and the late and the cal said at exact pressure trans-2 a passer to the or 29% co West Coll shet II s ses ent rines at readly text 2.5 Charle a tax or story of all ar a harross holy tank in ear tect post a PMPOh. ANT Door lestark esign er dos se er ex to prevent the a area na ree ng on the back experienced with smale time insts Sought-Tank Units complete with harness \$59.95 rendy-to-use

AT THIS LOW PRICE

Avoid seasonal rush! Send check or Money Order today, If C.O.D., 25% with order, 10% deposit holds purchase. Complete illustrated literature on request.

DIVE CRAFT, INC. Box 37, Wilmerding 9, Pa.

MAKES INSULATED ELECTRICAL CONNECTIONS Splices Crimps Strips Cuts WIRE

AMP CHAMP HAND TOOL is an electrician's tool adapted for home workshops. Makes completely insulated splices and connections in house wiring, appliances, auto, etc. It crimps solderless terminals and connectors. It splices and strips wire. No tape or solder needed. It shears bolts leaving threads undamaged. Terminals, connectors and insulators free. \$3.95 postpaid. T. W. Berger, national dealer and consumer distributor. Aircraft-Marioe Products, Inc., American Bidg., Cincinnati 2, Obso

FREE!	1. W. Berger, Inc., Distributor 1319-A, American Bldg., Cincinnati 2, Ohio Both me a Champ Tool. 2 am anciocing \$3.95.
Tormingle Connectors	Rame
	CityState.

WHAT'S NEW ABOUT NEW

Everything! It's even more accurate, more versatile, easier to operate! See it at your dealer's now. For big, new, free booklet with 20 pages of pictures, data, drop a cord to: SHOPSMITH, Dept. 261-A, 12819 Coit Rd., Cleveland E, Ohio



FREE BOOK -"How to Do a Good Paint Job!"
Send card (and name of your retailer, if
you wish) to Baker Brush Co., Inc., 83
Grand St., New York City 13

Brushesky Baker

Finding Fortunes in Uranium
[Continued from page 96]

shaft-sinking and drilling by his Utex Exploration Company shows the ore body so extensive that it may contain as much as \$100,000,000 worth of ore. Others have since struck it rich near his claims, too, and the booming new uranium region may eventually rival or surpass the Colorado Plateau's carnotite district.

Government Offers Aids

The Government doesn't mine uranium itself-it encourages private enterprise to do the job, and does all it can to help, through the AEC, the Geological Survey and the Bureau of Mines. Its experts have walked thousands of miles of canyon rims, examined more than 5,000 mines and prospecting diggings, flown airborne ore-detecting instruments more than 60,000 miles, and examined more than 40,000 samples of rock submitted by the public and their own staff. Bulletins and reports make public their findings. And prospectors may examine maps, newly posted in AEC offices on the fifteenth of each month, showing them likely places to look for uranium.

Planes carrying radioactivity-detecting instruments have flown over the mapped areas, and marks on the maps show wherever unusual radioactivity indicates possible uranium deposits. The AEC now flies six Super Cub planes equipped for this new technique of airborne prospecting, and private companies are following suit. In the new South Dakota carnotite region, three-fourths of the mines were discovered from the air.

Geological Survey parties, on their way by road to investigate reported deposits of uranium, sometimes find it nearer at hand. To miss no bets, they ride in a truck with a king-size Geiger counter on its roof. Thus uranium has been found in places where geologists would never have thought of looking for it.

How can you find uranium yourself? If you're interested seriously enough to want all the practical details, your meat is a best seller among Government publi-

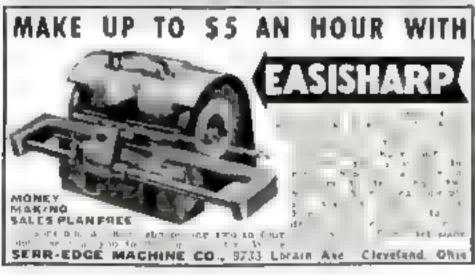
[Continued on page 242]











THE CAHILL WONDER TOOL

Here is a precision instrument designed to sharpen any tool around the house and garden.

This Cohill Wonder Tool has a variety of uses. For sharpening instruments this multi-use tool creates a sharp piercing edge by removing the dull steel that no longer cuts. The demand for this tool is large—and people are looking for it in Hardware and Chain Stores. For firms ordering three dozen, a mat of the cut shown in this ad will be sent free for catalogues or newspapers, Dealers CTUAL SIZE ordering three gross will receive a 16mm sound commercial for use on TV or in store. Mail-order firms will find this utility tool a "boon" to its present line. For people who want to go Into bustness of their own—the Cabill Tool offers a way to start a profitable mail-order business. An attractive car-ton plus explanatory circular goes with each tool. No drop shipment. No credit, Up to 100 gross can be shipped the same day the order is received. Send no money . . . just your name and address. For one sample tool, pay postman \$1.00 plus postage. If you send \$1.00 cash pre-paid, we will pay postuge. Dozen Tools \$5.00. Send 1/2 Cash Bal, CO.D. Gross \$48.00. Send 1/2 Cash Bal, C.O.D. Ten

Grass Lots \$44.00 per Grass.

Send 1/3 Cash Bal. C.O.D.

Cutting bar extended for sharpening lown mow-

ALBERT CAHILL STEEL & IRON WORKS
ADAMS AVENUE TOMS RIVER, N. J.

ers, sickles, scythes, garden hoes, and cleavers.

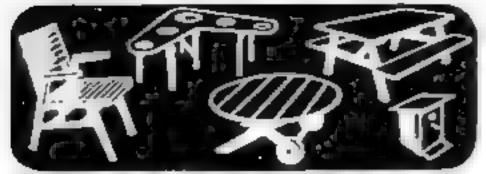
80

LO

00

W

AUGUST 1954 241



BUILD THIS BEAUTIFUL, LOW COST OUTDOOR FURNITURE

ATLAS Outdoor Plan Book gives you clear instructions and simple diagrams for building 18 smart, modern pieces of parch or garden furniture and equipment.

BUILD THEM BETTER WITH AMERICA'S NEWEST AND FINEST 8" TILT/ARBOR BALL BEARING CIRCULAR SAW . . . THE GREAT NEW



Itlas 3021

ATLAS PRESS COMPANY 825 N. Pitcher St., Kalamazee, Mich.

Send FREE LITERATURE on No. 2021 Circular Saw, and the name of my nearest franchised ATLAS dealer.

Enclosed is 50c for PLAN SQOK No. 2 (65c outside U.S.)

ADDRESS ...

STATE

you can DO so much MORE so much BETTER with



	EDUNTRY CA	RPORT
This basic design many possibilities	offices an extra	make it yourself!

porch, a severed terrace, framing for another from—or, as designed, a carport with tool shed, potting beach and storage compartments. The plan adapts to meet your needs. You build without blueprints! Our simplified Easi-Bird. Pattern #173 specifies all materials required, shows how to cut each piece to size, how to finish the job professionally. You save up to two-thirds of the usual cost! The major material used is Homesote — the oldest and strongest insulating-building board on the market—distribu-

ted by building materials dealers throughout the United States and in Canada.

NEW! Three illustrated folders - suggesting 18 practical make it at home states to the selection.

NEW! Three illustrated folders - suggesting 18 practical make-it-at-home projects-tanging from the attic to the cellar. Mail the coupon today for your pattern and/or folders.

"T. M. Beg. East Bad Pattern Company

MAKE	it c	tt	he	>27	16	3.			t	31	ti	h		H	C	1	Y	/	l	S	()	Ţ		6
HOMASOT Lenclose: (E C	O.,	(Q tot	₹P	t. fo	a. de	i. Ici	Ţ	î Ç	21	(0)	n H	3. .0	O	N fe	ď	P	at	u	:1	D	-	:2	7	3
NAME .																									
ADDRESS																									
CITY.																									
My lumber	deal	et .	is.	٠.																			- 1		4

747 POPULAR SCIENCE

Finding Fortunes in Uranium [(.ontinued from page 240]

cations, the official pocket manual entitled Prospecting for Uranium. It may be obtained for 55 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., and its 123 pages of text are crammed with helpful information.

Pointers for Uranium Seekers

But here are just a few tips from experts that may help some reader to discover a new uranium deposit:

Know what uranium minerals look like. You can see them in museums, buy them from dealers in mineral specimens, or study eight color photographs of them in the Government manual

Look in likely places. Carnotite deposits often are found along former beds of ancient streams. And they turn up in petrified logs and branches, whose carbonaceous material seems to have favored deposition of uranium.

Watch for guiding clues. Where darkpurple or black fluorite is found, the vicinity should be checked for radioactivity; sometimes dark-colored fluorite and uranium occur together, although there are many exceptions. Scattered flakes of green and yellow secondary uranium minerals, such as torbernite and autumite, may be surface signs of an underlying pitchblende vein.

Nevertheless, the most favorable site, by signs such as these, may prove utterly barren of uranium. And where there shouldn't be any uranium, by all the "rules," a bonanza may be discovered. That's the gamble and excitement of it—uranium is where you find it.

What a Question

The steel worker, lunch pail in hand, was hobbling noticeably when the foreman asked the trouble.

"Got a nail in my shoe."

"Why don't you take it out?" asked the fore-

"What! . . . On my lunch how?"—The Wyatt Way.



EQUIP TOUR OWN BUME, INC.

EASILY SELL FRIENDS, MERCHBORS

No inventory or special tools to huy!

All sizes redwood or application,
ahipped impeted down, factors to you.

In you fill orders. Top quality win,
down screen and glass panets was ly
changed from indoors! A sound profit
opportunity, proved by thousands of
hales over 30 years You can sho arropers to offer low easy PHA terms,
through your toes! bank

WRITE FOR DETAILS TOOAY!

Year Cost Only \$4.45° You Sall For \$21.40

Wifer 2015" 250" is indeed place erreen elath and glass you has tocally Other a err and atmosphis elightly higher t

BUCKEYE SCREEN & WEATHERSTRIP CO. 1378 S., 22nd Street, Columbus, Oklo



NEW, IMPROYED CALCULATOR FOR WOODWORKERS only 25c

Instantif gives information on lumber, pails, concrete mixes, painting materials, etc Convenient, timple to read. Just set dial for half spec heattoms, to convert linear to board feet, and but sizes for screws, compare characteristics of woods 6' diamore heavily varuished cardboard. 25c no stampt, please to Greenite Tool Co., . > Coumbia Avenue, Rockford, Islinois,





48-41 You Dom St. Long Island City, N. Y.

Send 20s for 28-page Catalog

NY PRANCISCO POWER TRANSMISSION



il has Infini e Sprede o to 550 Reverse Automatic Overload Protection: Adjustance Tor jun up to 150 Inch pounds 54" Input and Out out Fb fts ft wit handte late 1 g life Monor has mensures "12" long 7" high disg wide VALLE OVER \$2.00 Op

anty \$54.50 Shipping Wt 25# On Fob. Chicago n 48 % Deposit

DIRZUIS MACHINE SHOP "Q" 1423-25 52nd Ave., Citero Su, III.



1.001 USES-MOUSE CARDEN, FARM Heigith At Chapters often a base at 1 1 1 H capate a 12 1 to 12 H de mar 12 1 to 12 H de mar 12 1 to 12 H de mar 12 12 H de COES NOT CLOG OR MUST

Pristing of Hearth with white twent of Miss and Street Village to the temperature of the temperature of the street LABANCO PUMPS Boyr Ment I M. J.



CHT BUILDING COSTS 35

Make Your Own Concrete BLOCKS and BRICKS To Use or Sell

New superior moulds make absolutely square true easy to-lay blocks which w I pass any building code. Produc-tion is fast easy One durable \$19 machine will make four 5"x8"x12" bucks per minute-1 000 a day Pays for itself in one day! Sell blocks for big profit of sate % building cost for yourself POST CARD BRINGS PRES POLDER

ECONOMY MFG. CO. DEPT. \$ STONE MOUNTAIN, CA

HOW TO STOP VALVE TROUBLES

by DUANE CARTER International Racing Champion

I race for a living . . . depend on a smoothrunning engine for my bread and butter. That's why I use Miracle Power in the gas and oil of my racers—and private car, too. You see, heat in upper cylinder areas, even in passenger cars, often reaches 1400° F over twice the temperature at which oil burns off! So you can't count on oil to lubricate valves and lifters. But Miracle Power is not affected by extreme temperatures. It keeps valves free and lubricates when heat breaks oil down. And Miracle Power prevents Dry Starting Damage - cause of most engine wear, because oil can't reach all parts right after starting But a light, tough film of Miracle Power is always there preventing dry metal to metal contact.

An independent laboratory reports Miracle Power means more power, longer engine life and less oil consumption-just what I've found in my experience. Get this free report from The AP Parts Corporation, Dept. Toledo, Ohio. And start using Miracle Power in your gas and oil today, It will pay off for

you, as for me!



Miracle Power, a blend of super lubricants, including calloidal synthetic graphite in suspension, treats the engine, not the oil. 05c size for use in gas and oil every 1000 miles and 39c size for top cylinder. lubricant between treatments. (Slightly more in Canada.) Money back guerantee at car

dealers, garages, gas stations. Approved by Ford, Keiser and Willys for sole through their dealers.

AP Parts Corp., 1954

PRECISION LEVELING INSTRUMENT for anly \$1995

With the New LEVELALL one man can do the work
of two men and a transit, quickly, easily, accurate-
ly. All alone you can speedily level points for foot-
ings, forms, piping, that wells, sills, lintels,
floors, ceilings, roads, driveways, lawns - any
type of construction work, Send for Free booklet
or, better yet, order a DeLuze Levelali today.

E4-	

State Zone...

🗋 Mail 75' DeLuxe Levelall 🚱 \$12.95 😭 Regular 50' model @ \$9.95 [] Ship postpaid full price enclosed. Ship C.O.D. Money-back astisfaction goaranteed. LEVELALL, 21H Webster Street, Reckland, Mass.



UNITED STATES PLYWOOD CORPORATION







with Plastic Wood, Apply it to cracks . . . handles like putty, hardens into wood . . . lasts as long as the wood it



244 POPULAR SCIENCE

Let's Put Some Science in SF [Continued from page 137]

quire refueling only a few times a year. Could not thrilling stories be told about the railroads of the future?

The sea has an endless fascination for men. Moby Dick came out of its depths. Could a new age of whaling arise from warm water set flowing by submerged islands of nuclear power?

Robot Criminals and a Robot Court?

Electronic brains can talk to each other by telephone; some of them have been put to work sifting clues to detect criminals; a few have been assigned to deal with traffic-law violators. Since automobiles that drive themselves are in experimental operation already, can we expect to have justice tempered with mercy in a robot traffic court presiding over robot drivers?

The answer to the last question is clear: no, we cannot have either justice or mercy unless science-fiction writers start now to prepare the human minds that eventually will instruct robots.

The peak of true artistry is reached when the master craftsman-sculptor, painter, musician or writer—so faithfully transmits the currents of life about him that his work reveals the future taking shape.

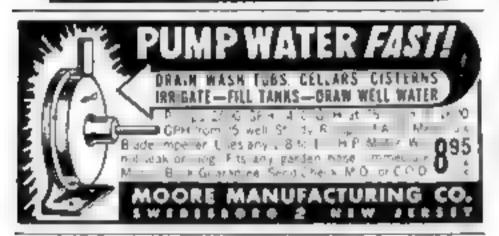
There can be no doubt whatever that the future of democracy depends on science. Nuclear and electronic discoveries are whirling us through space and time at ever faster speeds. Only those brains that keep pace can possibly control the good or evil that the unending spawn of machines will do. And thousands of brains are disqualifying themselves because the human spirits to which they belong have come to loathe and fear science.

Number of Science Teachers Disindles

The crisis is not approaching. It is upon us. According to the National Manpower Council the United States will not have enough scientists to keep up with science for at least 10 years. Fewer

[Continued on page 246]





SPECIAL OFFEE — Only 104 50-Page "Tools and Rules" Book

"The Tools and Rules for Precision Measuring" tells how to make accuracy a habit, shows the methods skilled mechanics use. 100 pictures plus reference tables, Send only one dime, Address Dept. FS.



THE L. S. STARRETT CO. . ATHOL MASS., U. S. A.



Complete with everything. Ready to plug in 110 volte AC. 15-30 Amps. 3 heats Welds metal from 1/16" to 1/4" using 1 16" to 3 32" standard rods Guaranteed unconditions v 10 day tree No COD. Does everything welders costing up to \$75.00 do. Buy direct and save

ESSAY MFG. CO., INC., Dept. 47, Quincy 69, Mass.

- MVE TO TOTAL
- Paint Spray Outfits
- Queoline Chain Saw Water Pumps
- Binoculars
- Tergentias
- Electron la
- * Air Compressors
- Hydraults Undte
- · Etertriu Tuela
- Air Tooks
- Power Plants
- · Display Lights · Burreyten feet.
- · Wood Spray Gutfits

FREE CATALOG

830 "O" BL.

Burden Pays All Freight 1988 a roma Send Card Todays

LINCOLN, NERR.



30 ea. 1/60" to L4" 83 50 10 ea. 1/4" to 14" \$3.50

PORTED PRECISION SQUARES Accuracy Blades -- Tem 2" \$1.50 8" \$2 10 Mfr 3" 1 70 8" 2 80 Guar. 4" 1 90 10" 3 80 Carl 5" 2 10 12" 4 \$0 Incl. Comb. Set 2" to 12" \$19.55

P. C. GENERATORS for Walding Surrenteed Perfect P. | 24Y 200amp. \$12 50 N.1.30Y 300amp. 21 50 Including Diagram.

ALTIMETER SALE Ment. Perf. 0-35,000 56 95 | Increment 20 Inst) — Brand New 0-21 54 50, Cat. 15c or Free 0-20,000 Order.

Check or M.O. E.S. day on C.O.D. F.O.S. L.A.
MEYRO PRECISION TOOL CO. Dept. 58
1807 S. La Cionega. Los Angeles 35. Cat., Phone: Bandshow 2-2538





- 60 full pages of pictures, and specifications of newest trailer models!
- Biggest free book on mobile homes ever offered! 128 pages in all!

	Manufacturers As: N. Wacker Drive, els	in.
Please send fre	e copy of "Mobile	Life".
Name		
Street		
City	Zowe	State



Wonder-Paste does the hard work in removing paint, varnish, lacquer, enamel from any surface. Softens up finish so it comes off easily—not coat by coat, but all in one accaping Cangs to upright surfaces. Remains moist so you can work on larger areas. At paint and hardware stores

Harmless to wood, metal, fabric and your hands

Write for leaflet and advice

on your removing problem

Wilson-Imperial Co., 121 Chesteat St., Newark S. N.J.





ing rough edges of tomtom to a large that work too. Planes only
wood prowood are hard board up to 2" we e.
EXCLUSIVE ATTACHING FEATURE
Stainless steel camps strap and four a quet
able a grang screws hold planer and drail
firmly together Changes on or off in a jiffy
heat-treated spiral rutary cutter 2" will with

Extra todgle bent-treated spiral rutary cutter 2° wille with cutting depth adjustable up to 4° Strong but lightweight dis-cast aboy frame Long wearing genra scaled in lubricant Genra and cutter enclosed for safety A lool you'll appreciate

SATISFACTION GUARANTEED OR MONEY BACK. Complete, ready to complete your drill 140

Complete, ready to comp to your drill

Will ship COD plus postage fees
Literature gives complete description.

Pustpald

BANDING ATTACHMENT for Planer and 2 Sanding Drums, \$1.00 extra DEALER INQUINIES INVITED

ALADDIN MFG. CO.

Dopt. PS-2, 3128 Harrison KANSAS CITY, MO.

Let's Put Some Science in SF

young people are preparing to teach science than any other subject in the public-school curriculum. The annual crop of potential science-teaching aspirants is dwindling toward half the potential need. In the country's high schools, the significance of science has been perversely minimized by requiring one of every two science teachers to teach other subjects on the side.

What a boon it would be to these overworked professors—and to American ideals, not to mention our common safety—if the scientific background of science-fiction were authentic enough to allow SF short stories and novels to be assigned as out-of-class reading!

Obviously, this could be a primary way to stimulate American youth to appreciate the logical spirit of scientific inquiry, to think imaginatively within a stated discipline, to carry on the warfare that science from its beginning has waged against human ignorance and misery.

Science-fiction cannot play this vital role in our civilization as long as its writers merely label cowboy, detective and sex stories "scientific"—nor as long as their philosophy persists in dooming mankind by means of disintegrator buttons pushed by robots hot-rodding through space on comets.

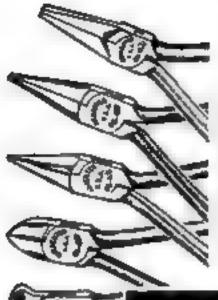
I am willing to predict that the next great science-fiction classic will substitute hope for horror, faith for despair, and tell its story in the simple everyday words of the ordinary man who today fears science because he thinks "it's too far over my head."

Man Is Responsible for His Destiny

Above all, this next great SF classic will make unmistakably plain the established scientific fact that man is responsible for his acts.

The author of this future classic will not allow himself to forget that he is writing primarily about people. But neither will be accept the gibberish Wil-

[Continued on page 248]



PRECISION **PLIERS**

· for accurate, exacting work use the fine, small pivers jewelers and watchmakers use - Kroouter's Precision Pliers. Motched in size and handle shape, drop forged from selected tool steel, machined and heat treated to exacting specifications. For habby crafters, model builders, TV and radio technicians.

Buy wherever fine tools are said ie U. S. and Canada.

KRAEUTER

for next 5 issues of famous DELTAGRAM, best home woodworking magazine you eve saw Packed with shop-tested ideas—12 to 15 in such Division, Rockwell Mfg. Co. 5941 N. Lexington Ave., Pittsburgh 8. Pinney Ivania.

IN YOUR SPARE TIME

UP TO \$40 A DAY IN YOUR OWN DUSINESS, Easy to start repeal cash business at home with the No CELSAW , pharpmong and setting distorber stones, groundting planter and dalatine harvers, Love Court. only \$1.5 deriva-

Start to your the day your SE.SAW privac. No exarmone needed. Namirate of joke in your neighbor ud. Sand Inday for from Book, "Lifetione Security",

BELSAW MACHINERY CO 4407-CField Bidg , Kansas City L1 Mo.





GOLD-SILVER-COINS

Easily located with new Lightweight M-Scope Detretor, Superior performance, lowest price, monthly payment թևոր,

PREE LIFERATURE

FISHER RESEARCH LAB., INC.

PALO ALTO

We will pay up to \$300.00 for Information concerning new sources of acrap magnesium which we can buy on a contract basis. Any type of scrap magnesium-borings, shavings, cuttings - scrap magnesium in any form Many grants today use magnesium and then throw the scrap away. Maybe yours does investigate and write today and you may qualify for a bonus of up to \$300 00.

STANDARD MAGNESIUM CORP. 4900 East 41st Street . Tuisa, Oklabems.

Extruded SAVE OVER 50% ON Aluminum

STORM WINDOWS AND DOORS

Send for FREE "Do-It-Yourself" Book-PS854

U = FAB = IT = URSE

Warthington, Ohio

COMBINATION SCREEN-STORM WINDOWS & BOORS + CASEMENT PICTURE-BASEMENT WINDOWS + SCHEEN BOORS & SCREENS

LD YOUR POWER TOOLS - GI

Exclusive GIL-BILT Build-It-Yourself Features

Notice of the first state of the state of th

GIL-BILT TO-in. TILT/ARBOR SAW

From m and the in reports in front of bode

If m b u r mas Ma in deep. (Die für 45 deepers

From model til high indie siwaya

00

POSTPAID

New December will begoing after the profitered with Lighted dear for the same harden and begoing subspeed ready to end.
 Jackston and the lat. dis hands been powers one makes binds.
 I and a one can retter gaver and so for lithing tip I nee guide.

('Il full 7 Wetal Parts by the uses Plans, im') but he arise to be game table on the federal and should be the therital on the horse and plants metal parts are an architectured parts. the property of the property of the party state of which here is a not on flash \$22.98 same bit with Mar I women on the co. \$24.90

GIL-BILT 12-INCH BAND SAW

alle for excited in the side of the are, et al. wie to be benea alek-

a to find the P. Da. L. deserges

are which and are par or curs on sealing New De-The life hearter when I rate on two he's read to the control of and the control of the control o

a tigger and over must gland a. Each has ball thrust

ALSO AVAILABLE 100 to 1 Plant & Parts Will Harden by a big to be be to be be to be t

GILLIOM POWER TOOLS F. O. des 1-YM. Lambert Fleid

Made

"I did very well last year with my Felcycquipment, fling about 950 saws in my spare



time, About \$900 for me." Lee H. Mix, New York.

MAKE UP TO \$3 OR \$4 AN HOUR IN SPARE TIME

With a Foley Automatic Saw Flier you can file hand, band and circular saws better than the most expert hand filer. Cash bitsiness no canvassing. No eyestrain, no experience needed.

FREE BOOK-"MONEY MAKING FACTS"

shows just how you can start at home in space time, with small investment, no overhead—and develop into a full-time repair shop. Bend

coupon today nu salesman will call





Send Coupon for FREE BOOK

FOLEY MFG, CO. BIB-4 Folloy Bidg , Minneapplis 18, Minnesota Send FREE BOOK-"Money Making Facts."

Name

Address



410 W. 24th St., Holland, Mich.

Let's Put Some Science in SF [Continued from page 246]

liam Tenn expounded as logic in a recent issue of Science-Fiction Adventures:

Whether the people are modern homo sapiens hammering out the first rocket, twenty-fifth century mutants hammering out the first ssl-yyrdk, robots trying to form labor unions, androids fighting to have the manufacturer's label removed from their backsides, or monocotyledonous Arcturians pathetically attempting to smuggle themselves past Terran Immigration disguised as lima beans, it is first and foremost with their problems and view of themselves as people that the SF writer has to deal successfully.

Robots aren't and never will be human. So it's manifestly impossible for a human writer ever to think and feel like a robot. To make an issue of this distinction might be absurd at another time. But it is not absurd now. For, if any one superstition has, more than any other, caused people to reject and fear science, it is the belief that machines can be taught to think and thus to take over the management of human affairs.

Robots Can Only Follow Orders

Robots cannot think, nor will their progeny be able to think. They will be able to direct complicated tasks at high speed, and to correct mistakes they may make in the process. But their performance of the tasks will be only as efficient as human minds plan it, step by step, in advance; and the errors they correct will be only those errors that human minds foresee and calculate alternate actions for—in advance. Man's destiny will remain in man's own hands.

Science-fiction can mirror this truth of human life only by living up to its name: by applying disciplined creative imagination to the known discoveries and logical principles of science.

Dad's Contribution

The children may have their mother's eyes, intelligence and her curly hair—but they usually wind up with their father's car keys.—Wall Street Journal.

248 POPULAR SCIENCE

WELD IT YOURSELF

Weld, Cut, Broze, Solder IRON, STEEL, BRONZE, BRASS, ALUMINUM & OTHER METALS

Tool and Equipment breakdowns are always annoying and costly Don't let them bother you. Get a Dynamic Are Welder You can do expert work on your very first job. Welders operate from any properly wired 110 v AC line Also make your own wrought fron furn ture railings fences & knick-knacks Repair fenders, & bodies etc with the handlest tool" in your workshop, A Dynamic will pay for its low cost of \$38.50 F.O.B.

in both time and money

DYNAMIC INDUSTRIAL type
transformer Are Welder
78 amp, output for industrial
or Workshop use.

DYNAMIC

Dept. D3-H, 1006 B. Federal St. Chimps 14, 18;

EASY

Low from gay-

ment Pay as you

manny back goter

detacta. Complete

\$38.50

F.o.b. factory

Sa d on

bend for

we d

antee

ouths only

Free Details and "How to Weld"



Catalog • 3000 Novelties 10c

Sond LOC for amazing critating of moverties, five animate, scientific supplies, mobiles, furmakers planes à barts, looms, may a tricke joke articles unusual seeds, dady of timeawers, comerce optical goods, projectors, may as, lucky jewe-ry, religious novelties disputses, musical instruments stamps, Coins, puzzles fortune auto à bike accessories telescopes, magnifere, compagnes, banks, amokers gadgets artists supplies print na sere ensports, books, games, plants, etc. Send name, address à loc tel JOHNSON SMITH & CO. Dept. B32 Detroit 7, Michigan



631 LINDEN AVE., DEPT. 8, SUFFALO 16, NEW YORK







YOU SAVE #5 50%

Ready now complete automotive having saide. Everything for your car truck custom-styled car or bot red at at rock bottom towast price of Mard-to-find equipment, parts for care from PARTS of Mard-to-find equipment, Holly WOOD ACCESSURIES, HIGH REFFED PARTS CUSTOM-STYLING EQUIPMENT!

148 Pages packed
with items like
these. all at
Lowest Prices?
Asia rates Mullers,
prose Eastess, parts—
Tratamustess — Tires,
hebs:—Toots—Sortugs,

FREE valuable Safety Chart showing how shots — igning party free if you mail coupon for entaing TODAY with the to help pay postage and handling We credit the 25c on your first \$5-or-more order to Catalog will then be FREE TO YOU. Fill in and mail Coupon NOW!

J. C. WHITNEY & CO., 1317 T-4 Archer Ava., Chicago 16, IN.

J. C. WHITNEY & CO. 1917 T-8 Archer Ave., Chicago 18, III.

Rush giant 1934 Catalog of auto parts and accessories at lowest prices. I encirse 25c to cover part of cost which will be credited to one on my first \$5.00-or-more order

Address	-	-	+ 1	- 1	- 4			- 1	
City	- ++	_	 			State	1+1		

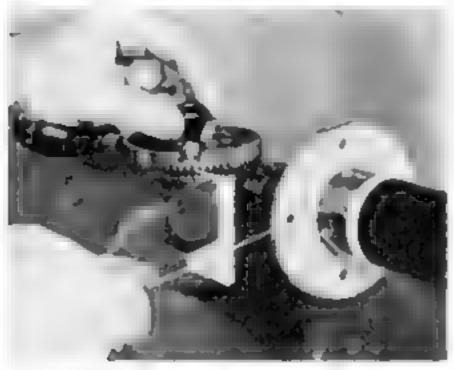
How Much Did You Learn?

By Stanford E. Taylor and Helen Frackenpohi

Washington Square Reading Center, New York

Now you can sample how much you remember of the useful and interesting information packed into this issue of Popular Science Monthly. Answers to the questions are printed just below the quiz. After each answer is a page reference to the article on which the question was based.

- 1. Taking good action pictures of boats depends in large part on
 - a. anticipating their maneuvers
 - b. correct shutter speed
 - e. keeping the wind to your back
- 2. This is a good way to



- a. unsnarl fishing line
- b, wind a Teela cost
- c. repair a telescope
- 3. West Virginia's 87 miles of new hillhopping superhighway have
 - n. 76 bridges
 - b. 14 tunnels
 - c. no toll gates
- 4. Hydrojet is a form of propulsion used in
 - u. scaplanes
 - b. model boats
 - e, amphibious troop carriers

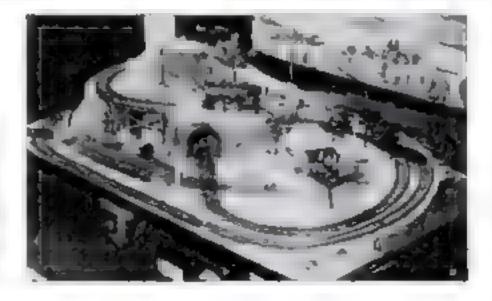
- 5. This year's Teen-Age Road-e-o to pick a national champion driver has attracted
 - a. 30,000 entrants
 - b. 140,000 entrants
 - c. 250,000 entrants
- 6. The fabulous new aircraft carrier Forrestal, to be launched this fall, has a length of
 - a. 893 feet
 - b. 1,039 feet
 - c. 1,203 feet
- 7. The hopper 'dozer was used to
 - a. move grain
 - b. collect grasshoppers
 - e. level jungle airstrips
- 8. MOUSE, an artificial satellite, is designed to be fired into the upper atmosphere to
 - a. serve as an interplanetary observatory
 - b, direct guided missiles
 - c. study solar and cosmic radiation
- If traveling down a long mountain grade causes your brakes to fade, you know that
 - a. lemperature is to blame
 - b. your brake fluid is low
 - c. the linings are worn
- 10. The Atomic Energy Commission's part in the national hunt for uranium is to
 - a. take over the mining operation
 - b. buy up all the ore mined
 - e. arrange for loans on mining equipment

Answers) 1. a-p. 186; 2. b-p. 190; 3. a-p 65, 4. b-p 170, 5. c-p. 80; 6. b-p 128, 7. b-p. 116; 6. c-p. 72; 9. a-p. 100, 10. b-p 92

NEXT MONTH ...

The New Boom in Table-Top Trains

Lack of space need no longer keep you from the fun of scale-model railroading. With tiny TT gauge, an elaborate layout fits on a table top—or into a suitcase. The September issue of PSM will tell how to get started and show interesting setups built by experts in this booming hobby.



Thie One E2JH-8YY-TY4P TERRIFIC VALUES

WATT PLANT 110-120 v. 60 syc.
AC. absolutely thest made — exciusive dynamically balanced armature; heavy windings develop up to 5000 wats overload for moder starting. Skud mounted — port-

GIANT 3000-2500 Ottown Bill

mounted - part-

STEAM MASTER



officient portable stoom generator that provides live steam at 100 ibs, pressure in 60 seconds from a rold start! The first quality steam blaster ever offered at this low price. Instantly cleans sticky grease, dict, rust, old paint, etc., etc., and rust chinery. Paye for it self in a few weeks, storilizes as it cleans milking disphines.

tanks, pulls lines, hog leouses, childen houses and breading pages. Ideal for sterilizing soil in alterniouses and bot beds—thawing out fromen carth, water pipen, materials, etc. Melta fromen carth, water pipen, materials, etc. Melta ite, anow to a flash. Fully automatic—oil fired with built-in water circulating pump. Drawa water from faucet or from barrel or backet. Simple and anfo, anyone can use (t—boilt-in safety valve. Complete with new triple officiency jet atoam gun—automatically misses in some of detergent if desired. Has 10° services of determinable wheels. Wt. 250 his.

Signal 400) Since, facinty price. 5293.00



HEAVY DUTY D-C ARC WELDER

Benier model. Made for years of treather ree. Will handle light or heavy tobs. Easily size up in handle for the ree.

mounting Flange (Rison 88) Hange (Rises 83) feath-in air coding agreement. Are is case to atrike and hold, because of specially destined are abbilings. Iti-to arithment and the control gives wide range of welding heats. Hen welder at 2500 rpm, with trainer, jeep or 15 hp. was entire, or 7 hp. else, motor, complete with instructions, guar, and triple V belt or that pulley. You can pay more, but you can't hav a better welder, wt. 110 hts. \$100 value at \$99.75 BUAL CONTROL MODEL, same as above but with huitin dual theoretal for low heat solderling, heating, welding. Special.

WELDING HIT TWO 10 ft, feedle, welding helmel, electrofe holder, ground clamp, Sold\$10.50 only with welder at .. \$10.50

with

Factory Prices Direct from PORTABLE LIGHT PLANTS



et MASTER

ideal for your camp. 600-700 WATTS

MECHANIC'S

PUSM BUTTON START
115 V. 60 csv. AC
flowered by a rugued
2 HP easy starting
Brisis empine. No
wiring necessary;
nost plug in and opscate. Plenty of curtent for ony oil burns
or, freezer, broader,
concepnacy lights.

omergency lights, etc. which require up to 100 watts, ideal for Civil Defense and Fire Rept. Complete with Voltmeter and imilia whening to charge 6 v. auto balteries. Rem 24. Wt. 75 lbs. Eastly lits in car truck. Be prepared if storm knocks out \$143.50 (cover lines, flee, \$275 value 1000-1200 ward Plant (liem 45) same as from 24 but larger generator and engine \$199.50 with 500 a greater outrust. 1800-1700 Wait Plant (Item 20 almilar to Item



Suttes Start, WL 370 Hes. \$399.50 Iteary duty CEMERATOR ONLY for belt drive. \$238.80 We make fully automatic controls to operate pay of the above light plants. Write for dentils. We make all sizes up to 25,000 Watts.

9 TON HYDRAULIC PRESS

A tremembers preserved hydraulic press, espaints of exercises 18,600 lbs. pressure. Pays for their many times over-straightening best connecting role, king plus, crank, shafts, paies, lick plus and hars — or pushing out frozen bearings and teachings. Beyon-upod pressure under pressure open pressure under pressure in the pressure of oped presence under pre-rise control and visible at all times on accurate gauge Complete with both large and small anvils med for in struighten say kind of curve or bead altern visit Wi, 110 lb, Actual hist price \$105, Our special \$69.50



GOODRICH for industrial use. Provides instant speed changes for any drive. For machine tools, drivers, printing, conveysors, production lines, posts—any operation requiring variable speed. Employs reinble trouble free, planetary system. No hatestant trouble free planetary systems. No hydraulic power hose ear infinite range, smooth operation, easy installation, 3 sixes, \$2-1 bp. 46 lbs.; 2-2 bp. wt. 55 izes, 2-3 bp. wt. 103 lbs.; Rev. list \$228, \$253

DIESEL LIGHT PLANT
Item 1000 Dieset Mater11-12 kw, 115/230 v, AC 10,
ele or 3 phase, 1800
rps: direct connected,
Electric Self-starting, Ingineered for perstainent
jumper where continuous low-rost,
beavy that serv-

beavy duty serv-ice is important. Wt. 1050 lb, Reg. list \$3650.00. Factory price ...

\$1895.00



CONDITIONAIRE

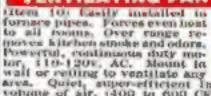
SAVE UP TO 85

ren relax to and to Mechanic's stile to the chanic's stile to the chanic's stile to the chanic's stile, had to the air pull in fresh coul air. High contour blade design and ventori shared frame morphage volume of air—coul life entire house in a few minutes at quiet how apress. Dyeamtrally balanced blade radius mounted shaft and motor, assure smooth quiet operation, Pre-drittel frame is easily mounted in a few

operation, Pre-drilled frame
is easily mounted in a few
mirates, last cut opening
and bolt in piace. Complete
with heavy they U₂ or U₃
hp. electric motor. Couple
thomare fans are built in our facinity-year lags
them at low factory prices.

Diano Opening Course Wt. Rem Price
25" 28 x 28 5 75 Hz 555 505,50
30" 54 x 54 7 60 Hz 555 \$74.50
30" 40 x 40 9 105 Hz 555 \$82.50
4.2" 40 x 40 11 150 Hz 555 \$93.50
Add 16.00 to above prices for inviscotal magnitus.

HEATING & **VEHTILATING FAN**



powerful, continuous duty manter, 110-120v. AC. Mount Id wall or rething to ventilate any area. Quiet, super-efficient Inn moves huge volume of air. (400 to 600 CFM).

6" Fan. wt. 5 lb.

6" Fan. wt. 6 lb.

10" Fan. wt. 6 lb.

12" Fan. wt. 8 lb.

12" Fan. wt. 8 lb.

14 Semi-enclosed motor, solitate for spray bostin, restainant exhausts, positry bouses, etc. (0" Fan. wt. 6 lb.

12" Fan. wt. 10 Su. Hom 10D: \$12.68

CONDITIONAIRE VENTILATING FAMS

Nave his money installing your own exhaust fap, for firstent propositor type blade cheven hime values of air quietty and effortleasty, thenry welled frame - predictly and effortleasty, thenry welled frame - predictly and cut opening and boil in place. Continuous daty matters, Ideal for silve, restaurants, parameta, barna, chicken houses, etc. Control manually or with thermostat, find their cut of the control manually or with thermostat, them to be able to the control of the control

10 lb. 27 lb. 50 lb. 41600



3056 linhe

52 pc. SOCKET SET



Ib, Inhe 19.05
Righest quality, guaranteed conbreakable sackets
made by Husky,
Reactifully matched
chrome thin wall
attey absolutely the
best, Contains a
complete set of the
and tar drive, plus
all necessary exten-

that write 802.00. Factory special serial se

379.50. 349.50 3114.50

CHEATERT THROUGH AN FETTING!

Solder like an Expert! NOW - IT'S EASY! "MIRACLE SOLDER PAINT NEW JUST PAINT ON AND HEAT Salder All Cammon Metals FASTER - STRONGER - MORE ECONOMICAL ONE LB

ONE IB = 4 LBS ORDINARY WIRE SOLDER FREE "Soldering Technique Guide - Agents Wanted BOW SOLDER PRODUCTS 251-P FREEMAN ST. > BROOKLYN 22, N.Y.

DIANICO GUARANTEED

12 bears

BUILD HELICOPTER GLIDER

famous new (The famous new orients, is now avail-smallest and safest electrift, is now avail-able to amateur builders in plane and blis-able to amateur builders in plane and drawing GYRO-GLIDER, world's Send \$1.00 now for three-view drawings with specimentions and ask about kits and detailed building and fring instruc-Linns. BENSEN AIRCHAFT CORP., Dopt. PS-7

P. O. Box 2621, Balelah, H. C. City State

Conviguent villagal

How I foxed the Navy

by Arthur Godfrey

The Navy almost scuttled me. I shudder to think of it. My crazy career could have ended right there.

To be scuttled by the Navy you've either got to do something wrong or neglect to do something right. They've got you both ways. For my part, I neglected to finish high school.

Ordinarily, a man can get along without a high school diploma. Plenty of men have. But not in the Navy. At least not in the U. S. Navy Materiel School at Bellevue, D. C., back in 1929. In those days a bluejacket had to have a mind like Einstein's. And I didn't.

"Godfrey," said the lieutenant a few days after I'd checked in, "either you learn mathematics and learn it fast or out you go. I'll give you six weeks." This, I figured, was it. For a guy who had to take off his shoes to count



above ten, it was an impossible assignment.

I was ready to turn in my bell-bottoms. But an ad in a magazine stopped me. Here, it said, is your chance to get special training in almost any subject—mathematics included. I hopped on it. Within a week I was enrolled with the International Correspondence Schools studying algebra, geometry and trig for all I was worth.

Came week-end liberty, I studied. Came a holiday, I studied. Came the end of the six weeks, I was top man in the class. Within six weeks I had mastered two years of high school math, thanks to the training I'd gotten.

I.C.S. made the impossible—easy!

GET EXPERT 3 FREE BOOKS 1. 36-page, pocket size career guide "How to Succeed." 2. Illustrated catalog on subject you check. 3. Free sample lesson text to demostrate I.C.S. method-

For Real Job Security—Get an I. C. S. Diploma!

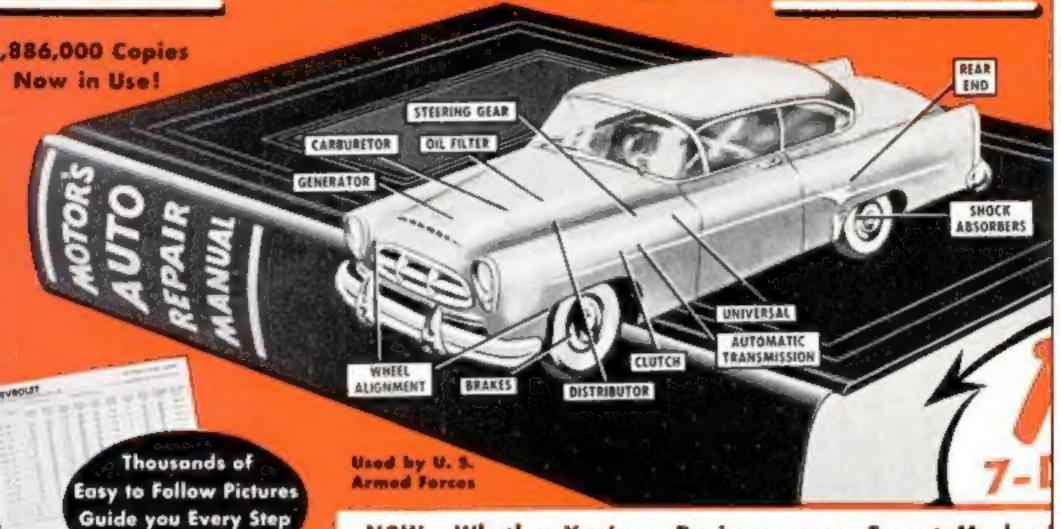
I. C. S., Scranton 9, Penna.

The state of the s	ARCHITECTURE and BUILDING CONSTRUCTION Air Conditioning—Refrig. Architecture Building Contractor Building Maintenance Corporate and MII Work Estimating Heating Painting Contractor Planting Contractor Reading Arch. Shanprints Steamfilling ART Carteoning Contraction Illustrating Reading Illustrating Reading Illustrating Show Card and Sign Lettering Sketching and Painting AUTOMOTIVE	AVIATION Apronautical Engineering Ir. Aircraft & Engine Mechanic BUSINESS Advertising Gookkeeping and Accounting Business Administration Gorsiness Correspondence Cartified Public Accounting Contified Public Accounting Continued Public Accounting Continued Public Accounting Continued Public Incomestry Chemical Engineering Chem. Cab. Technican General Chemistry	CIVIL, STRUCTURAL ENGINEERING Construction Engineering Highway Engineering Highway Engineering Sanctural Engineering Structural Engineering Surveying and Magazing DRAFTING Aircraft Orafting Architectural Drafting Hochanical Drafting Hino Serveying and Mapping Ship Drafting Structural Drafting Electrical Drafting Structural Drafting Electrical Engineering Electrical Engineering Electrical Engineering Electrical Engineering Electrical Maintenance Electrical Maintenance Electrical Maintenance Electrical Hall	Foremenship Indestrial Supervision Leadership and Organization Personnel-Labor Relations MECHANICAL AND SHOP Gen—Electric Walding Heat Treatment Matallergy Industrial Engineering Industrial Supervision Machine Design-Drafting Machine Shop Inspection Machine Shop Practice Machine Shop Practice Machine Shop Practice Machine Shop Practice Machine Shop Blueprints Refragoration Sheet Metal Worker Taol Design Taolingking RADIO, TELEVISION	Electric Light and Power Stationary Fireman Stationary Steam Engineerin TEXTILE Carding and Spinning Cotton, Rayon, Woolen Mfg. Finishing and Dyeing Leom Fixing Textile Designing Textile Engine Warping and Weeving Warping and Weeving All SCELLANEOUS
Auto Body Rebuilding Helteral Gas Prod. & Trans. Commercial Practical Radio—TV Engiring Ocean Navigation Auto-Engine Tone Up Plastica Plastica High School Schjechs Radio Operating Short Story Writing Auto-Engine Tone Up Plastica Plastica Mathematics Television—Technician Telephopy	Auto Elec, Technician Auto-Engine Tene Up	Heistral Gas Prod. & Trans. Petroloum Engineering Plasfica	Commercial Good English High School Sabjects	☐ Practical Radio—TV Eng'r'ng ☐ Radio and TV Servicing ☐ Radio Operating	Ocean Navigation Shipfitting Short Story Writing



Engines, Brakes, Transmissions, Rear Ends, Carburetor

下行行了



NOW — Whether You're a Beginner or an Expert Mechani You Can "Breeze Through" ANY AUTO REPAIR JOB! MOTOR'S BIG BRAND-NEW AUTO REPAIR MANUAL Shows You He With 2,950 PICTURES AND SIMPLE STEP-BY-STEP INSTRUCTIONS

COVERS EVERY JOB ON EVERY CAR BUILT FROM 1940 THRU

Same FREE Offer On

MOTOR'S Truck and

Tractor Manual

BRAND NEW! Coners EV-ERY sub on EXEMP popular make and named guardiar-powered truck, tractor made from 1946 thru 1954,

Over 2,250 illustrations:

Includes service and repair

procedures, essential se critical pas and trouble short-ing on Comming Directs and CM Directs 12

PEEE 7-Day Trial, Check-

YES, it's easy as A-B-C to do any "fix-it" job on any car whether it's a simple carburetor adjustment or a complete overhaul. Just look up the job in the index of MOTOR'S New 1,006page AUTO REPAIR MANUAL. Tuen to pages and pictures covering job. Follow the clear. illustrated step-by-step instructions. Prestothe job is done.

No guesswork! MOTOR'S Manual takes nothing for granted. Tells you where to start. What tools to use. Then it leads you easily and quickly through the

entire operation!

2,950 Pictures! Se Complete. So Simple, You CAN'T Go Wrong!

BRAND-NEW, REVISED of .. tion! ONE THOUSAND giant pages cover everything you need to know to repair any car. 2950 "This-Is-How" pictures lead you every step of the way, 292 "Quick-

Check" charis-22.598 essential repair specifications, Over 225,000 service and repair facts on ALL 685 chassis models from 1940 thru 1954. Instructions and pictures so clear you can't go

Even a green beginner mechanic can do a good job with this giant guide before him. You'll find yourself tackling jobs now that you wouldn't even touch before! And if you're a top mechanic, you'll value the time and laborsaving factory methods! No wonder of thousands of men call it the "A Man's Bible"!

The "Meet" of Over 140 Official Shop

The editors have put together the from over 146 Official Shop Manuali

dreds of service bul "boiled it down" into Hustrated easy-to-u

guide,

Here's ILLUSTRAT by-stop guidance you no ice and repair all types tineluding new Buick. Mercury overhead valv New Torque Converte Automatic Transmiss Chokes . . . Fuel Pump tion Systems . . . Gene Carburetors . . . Univ Axles . . Brakes Steering . . . Shock Abi

Air Conditioning, AND MUCH MO

SEND NO MONEY

Mail PREE-TRIAL Postcord NO

Send no money. Try this book at our whole week absolutely FREE! Test it garage or shop. Make it show you what dosen't pay for itself in 7 days, just repay nothing. Mall postag:-paid Fire NOW to MOTOR Book Dept., Desk 28 Sath St., New York 19, N. Y.

COVERS 685 MODELS-ALL THESE MAKES Buick Cadillac опомати сноить

NAME OF SOIO

AND

CHARGO

DODGE PERMOUTH

Chevrolet Chrysler Crosley DeSoto Dodge Ford Frazer Henry J Hudson Kalser Lincoln Mercury Nash Oldsmobile Packard Plymouth Pontiac Studebaker WIHYS

of the Way

Includes ALL

1954 cars

New Engines Power Steering

ALL Automatic Transzitissjutis.

Much, Much. Morel

John Wayne...a Camel fan goin' on 24 years!



For MILDNESS ... for FLAVOR

Camels agree with more people than any other cigarette!